

**IBM Workload Automation**  
**Scheduling Applications with IBM Workload Automation**  
**Version 9.5 Fix Pack 7**

## Note

Before using this information and the product it supports, read the information in [Notices on page cccxi](#).

This edition applies to version 9, release 5, modification level 0 of IBM Workload Scheduler (program number 5698-WSH) and to all subsequent releases and modifications until otherwise indicated in new editions.

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## About this Publication

This guide provides information about how to set up and use IBM Workload Scheduler. It contains the following information:

- Job plug-ins or adaptors for the following applications:
  - Amazon EC2
  - Apache Oozie
  - Apache Spark
  - IBM® BigInsights
  - IBM® Cognos
  - IBM® Cloudant
  - IBM InfoSphere DataStage
  - IBM Sterling Connect:Direct
  - IBM WebSphere® MQ
  - IBM® SoftLayer
  - Hadoop Distributed File System
  - Hadoop Map Reduce
  - Informatica PowerCenter
  - Microsoft Azure
  - Oracle E-Business Suite
  - Salesforce
  - SAP BusinessObjects BI
  - SAP PI Channel
- Access methods that run and control jobs of the following applications:
  - PeopleSoft
  - SAP
  - z/OS
- Integration with SAP:
  - SAP R/3 access method
  - Job plug-in for SAP BusinessObjects BI
  - Job plug-in for SAP PI Channel
  - Integration with SAP Solution Manager

## What is new in this release

Learn what is new in this release.

For information about the new or changed functions in this release, see *IBM Workload Automation: Overview*, section *Summary of enhancements*.

For information about the APARs that this release addresses, see the IBM Workload Scheduler Release Notes at [IBM Workload Scheduler Release Notes](#) and the Dynamic Workload Console Release Notes at [Dynamic Workload Console Release Notes](#). For information about the APARs addressed in a fix pack, refer to the readme file for the fix pack.

New or changed content is marked with revision bars.

## Accessibility

Accessibility features help users with a physical disability, such as restricted mobility or limited vision, to use software products successfully.

With this product, you can use assistive technologies to hear and navigate the interface. You can also use the keyboard instead of the mouse to operate all features of the graphical user interface.

For full information, see the Accessibility Appendix in the *IBM Workload Scheduler User's Guide and Reference*.

## Technical training

Cloud & Smarter Infrastructure provides technical training.

For Cloud & Smarter Infrastructure technical training information, see: <http://www.ibm.com/software/tivoli/education>

## Support information

IBM provides several ways for you to obtain support when you encounter a problem.

If you have a problem with your IBM software, you want to resolve it quickly. IBM provides the following ways for you to obtain the support you need:

- Searching knowledge bases: You can search across a large collection of known problems and workarounds, Technotes, and other information.
- Obtaining fixes: You can locate the latest fixes that are already available for your product.
- Contacting IBM Software Support: If you still cannot solve your problem, and you need to work with someone from IBM, you can use a variety of ways to contact IBM Software Support.

For more information about these three ways of resolving problems, see the appendix about support information in *IBM Workload Scheduler: Troubleshooting Guide*.

## How to read syntax diagrams

Syntax diagrams help to show syntax in a graphical way.

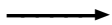
Throughout this publication, syntax is described in diagrams like the one shown here, which describes the SRSTAT TSO command:

```
{SRSTAT} · resource name · [SUBSYS ( {OPCA | subsystem name | MSTR} )][AVAIL ( {KEEP | RESET | NO | YES} )][
DEVIATION ( {KEEP | amount | RESET} )][QUANTITY ( {KEEP | amount | RESET} )][CREATE ( {YES | NO} )][TRACE ( {0 /
trace level} )]
```

The symbols have these meanings:



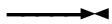
The statement begins here.



The statement is continued on the next line.



The statement is continued from a previous line.



The statement ends here.

Read the syntax diagrams from left to right and from top to bottom, following the path of the line.

These are the conventions used in the diagrams:

- Required items appear on the horizontal line (main path):

```
STATEMENT required item
```

- Optional items appear below the main path:

```
STATEMENT [optional item]
```

- An arrow returning to the left above the item indicates an item that you can repeat. If a separator is required between items, it is shown on the repeat arrow.

```
STATEMENT repeatable item
```

- If you can choose from two or more items, they appear vertically in a stack.

- If you must choose one of the items, one item of the stack appears on the main path:

```
STATEMENT {required choice 1 | required choice 2}
```

- If choosing one of the items is optional, the entire stack appears below the main path:

```
STATEMENT [{optional choice 1 | optional choice 2}]
```

- A repeat arrow above a stack indicates that you can make more than one choice from the stacked items:

```
STATEMENT [{ | optional choice 1 | optional choice 2 | optional choice 3}]
```

```
STATEMENT { | required choice 1 | required choice 2 | required choice 3}
```

- Parameters that are above the main line are default parameters:

```
STATEMENT [{default | alternative}]
```

- Keywords appear in uppercase (for example, STATEMENT).
- Parentheses and commas must be entered as part of the command syntax, as shown.

- For complex commands, the item attributes might not fit on one horizontal line. If that line cannot be split, the attributes appear at the bottom of the syntax diagram:

```
STATEMENT { required choice 1 [ optional choice 1 ( { default / alternative } ) ] [ optional choice 2 ( { default / alternative } ) ] | required choice 2 | required choice 3 }
```

# Part I. Overview

Learn about plug-ins and access methods and how you can use them to extend IBM Workload Scheduler scheduling capabilities to external applications and systems.



**Important:** In order to be entitled to use the access methods and plug-ins, you must have purchased at least one of the following offerings: IBM Workload Scheduler, IBM Workload Scheduler for Applications, or IBM Z Workload Scheduler Agent. See the IBM Workload Scheduler Download document for details: [IBM Workload Scheduler download document](#). For information about the supported versions of the plug-ins and access methods, open the [Data Integration](#) report and select the **Supported Software** tab.

You can extend job scheduling capabilities with IBM Workload Scheduler plug-ins to external applications to take advantage of all the IBM Workload Scheduler functions to manage the operations and tasks performed by the external applications.



**Note:** Some of the old plug-ins previously provided with the product, are now out-of-the-box integrations available on [Automation Hub](#). The related documentation has been removed from the product library and has been made available on [Automation Hub](#).

In addition to these job plug-ins, you can find new integrations on [Automation Hub](#) that extend your automation processes.

The plug-ins are:

**Table 1. Job plug-ins**

| Job Plug-in                    | More information                                    |
|--------------------------------|---|
| Amazon EC2                     | <a href="#">Amazon EC2 jobs</a>                     |
| Apache Oozie                   | <a href="#">Apache Oozie jobs</a>                   |
| Apache Spark                   | <a href="#">Apache Spark jobs</a>                   |
| IBM® BigInsights               | <a href="#">IBM BigInsights jobs on page 24</a>     |
| IBM® Cloudant                  | <a href="#">IBM Cloudant jobs</a>                   |
| IBM® Cognos                    | <a href="#">IBM Cognos jobs on page 27</a>          |
| IBM InfoSphere DataStage       | <a href="#">IBM InfoSphere DataStage jobs</a>       |
| IBM Sterling Connect:Direct    | <a href="#">IBM Sterling Connect:Direct jobs</a>    |
| IBM WebSphere® MQ              | <a href="#">IBM WebSphere MQ jobs</a>               |
| IBM® SoftLayer                 | <a href="#">IBM SoftLayer jobs</a>                  |
| Hadoop Distributed File System | <a href="#">Hadoop Distributed File System jobs</a> |
| Hadoop Map Reduce              | <a href="#">Hadoop Map Reduce jobs</a>              |

**Table 1. Job plug-ins (continued)**

| <b>Job Plug-in</b>      | <b>More information</b>                                   |
|-------------------------|---|
| Informatica PowerCenter | <a href="#">Informatica PowerCenter jobs</a>              |
| Microsoft Azure         | <a href="#">Microsoft Azure jobs</a>                      |
| Oracle E-Business Suite | <a href="#">Oracle E-Business Suite jobs</a>              |
| UrbanCode Deploy        | <a href="#">UrbanCode Deploy jobs</a>                     |
| Salesforce              | <a href="#">Salesforce jobs</a>                           |
| SAP BusinessObjects BI  | <a href="#">SAP BusinessObjects BI jobs</a>               |
| SAP PI Channel          | <a href="#">SAP Process Integration (PI) Channel jobs</a> |

You can use access methods to extend the job scheduling capabilities of IBM Workload Scheduler to other systems and applications. Access methods run on:

- Extended agents to extend static scheduling capability.
- Dynamic agents and IBM Z Workload Scheduler Agents to extend dynamic scheduling capability.

For more details about which workstations can run the access methods, see [Supported agent workstations on page 16](#).

An access method interacts with the external system through either its command line or the Dynamic Workload Console. IBM Workload Scheduler includes the following access methods:

**Table 2. Access methods**

| <b>Access Method</b>      | <b>More information</b>                                     |
|---------------------------|---|
| SAP (r3batch)             | <a href="#">Configuring the SAP environment on page 129</a> |
| PeopleSoft (psagent)      | <a href="#">Access method for PeopleSoft on page 66</a>     |
| z/OS® (mvsjes and mvsopc) | <a href="#">Access method for z/OS on page 81</a>           |

Do not install IBM Tivoli Workload Scheduler for Applications, Version 8.6 on top of an IBM® Workload Scheduler version 9.3 and later installation, which can cause problems when running jobs. IBM Tivoli Workload Scheduler for Applications is no longer a separate installable component. All the access methods and plug-ins formerly included with IBM Tivoli Workload Scheduler for Applications are now automatically included in the IBM® Workload Scheduler Version 9.3 and later installation, which include more updated versions of the plug-ins with respect to IBM Tivoli Workload Scheduler for Applications, Version 8.6.

# Chapter 1. Supported agent workstations

You can extend IBM Workload Scheduler scheduling capabilities to external applications by using plug-ins and access methods.

To extend scheduling capabilities to external applications by using IBM Workload Scheduler job plug-ins, you must install either a dynamic agent or an IBM Z Workload Scheduler Agent (z-centric), or both.

To extend scheduling capabilities to external applications, such as PeopleSoft, SAP, and z/OS JES2 or JES3 by using IBM Workload Scheduler access methods, you must have at least one, or a combination of, the following types of agent workstations: dynamic agent, extended agent, and IBM Z Workload Scheduler Agent (z-centric).

These agent workstations are described as follows:

## Dynamic agents and IBM Z Workload Scheduler agents

Dynamic agents and IBM Z Workload Scheduler agents can manage a wide variety of job types. They are used to extend the dynamic scheduling capabilities of IBM Workload Scheduler to your external applications through appropriate job plug-ins.

Dynamic agents and IBM Z Workload Scheduler agents also extend the dynamic scheduling capabilities to external applications through access methods. To run access methods on external applications using dynamic agents, you define a job of type **Access Method**. The access method communicates with the external system to launch the job and returns the status of the job. The method uses the corresponding file named `optionsfile_accessmethod.opts` (where `optionsfile` is the configuration file that depends on the selected access method). The dynamic agent and the IBM Z Workload Scheduler agent can have more than one associated `.opts` file to determine which external environment instance it connects to. The access method can launch jobs on that instance and monitor them through completion, writing job progress and status information in the standard list file of the job.

Dynamic agents in particular, can be grouped in pools and dynamic pools. Pools group a set of dynamic agents with similar hardware or software characteristics together. When jobs are submitted to a pool, IBM Workload Scheduler balances the jobs among the dynamic agents within the pool. Dynamic pools are dynamically defined based on the resource requirements specified. A pool is dynamically updated whenever a new suitable dynamic agent becomes available. Jobs run on the first workstation in the dynamic pool that matches all the requirements of the job.

## Extended agents

Extended agents extend the static scheduling capability. They are logical workstations related to an access method hosted by a physical IBM Workload Scheduler workstation (a fault-tolerant agent). More than one extended agent workstation can be hosted by the same IBM Workload Scheduler fault-tolerant agent and rely on the same access method. The extended agent is defined in a standard IBM Workload Scheduler workstation definition, which gives the extended agent a name and a unique identifier. An access method is a program that is run by the hosting workstation whenever IBM Workload Scheduler submits a job to an external system.



Jobs are defined for an extended agent in the same manner as for other IBM Workload Scheduler workstations, except for any job attributes that depend on the external system or application.

To launch and monitor a job on an extended agent, the host runs the access method, passing to it job details as command line options. The access method communicates with the external system to launch the job and returns the status of the job. To launch a job in an external environment, IBM Workload Scheduler runs the extended agent access method providing it with the extended agent workstation unique identifier and information about the job. The method looks at the corresponding file named `XA_Unique_ID_accessmethod.opts` (where `XA_Unique_ID` is the unique identifier of the extended agent workstation, see [UNIQUE\\_ID on page 49](#) for details about retrieving the unique ID) to determine which external environment instance it connects to. The access method can then launch jobs on that instance and monitor them through completion, writing job progress and status information in the standard list file of the job.

Extended agents can also be used to run jobs in an end-to-end environment, where job scheduling and monitoring is managed from an IBM Z Workload Scheduler controller.

## Part II. Job plug-ins to extend workload scheduling capabilities

A wide variety of out-of-the-box adaptors or plug-ins are provided to integrate your business processes. The job plug-ins allow you to orchestrate Enterprise Resource Planning and Business Intelligence solutions (PeopleSoft, Oracle E-Business, Informatica PowerCenter, Salesforce) and other business related systems. New applications are added to your organization all the time. By integrating them into your existing IBM Workload Scheduler environment you save time in getting skilled on new applications because you can administer them just like any of your existing jobs.

By extending the concept of jobs and workload scheduling to other applications you can continue to define jobs for your business process, add them to job streams, submit them to run according to schedule, and then monitor any exceptions all from a single entry point. The job plug-ins require an IBM Workload Scheduler dynamic agent, IBM Z Workload Scheduler Agent (z-centric), or both. For more information, see [Supported agent workstations on page 16](#).



**Note:** Some of the old plug-ins previously provided with the product, are now out-of-the-box integrations available on [Automation Hub](#). The related documentation has been removed from the product library and has been made available on [Automation Hub](#).

In addition to these job plug-ins, you can find new integrations on [Automation Hub](#) that extend your automation processes.

The following sections provide an overview of creating job definitions and job streams, submitting them to run, monitoring them, and then analyzing the job log and job output. These procedures can be applied to any of the supported job plug-ins.

For information about the supported versions of the job plug-ins, generate a dynamic [Data Integration](#) report from the IBM® Software Product Compatibility Reports web site, and select the Supported Software tab.



**Tip:** Many of the IBM Workload Scheduler job plug-ins are illustrated in helpful, how-to demonstrations videos available on the [Workload Automation YouTube channel](#).

## Chapter 2. Defining a job

Define IBM Workload Scheduler jobs to run business tasks and processes defined in an external application.

Define an IBM Workload Scheduler job to run tasks or processes you have defined in external applications. Using the IBM Workload Scheduler job plug-in for your external application, you can define, schedule and run jobs to automate your business.

In distributed environment, define a job by using the Dynamic Workload Console connected to a distributed engine, by using Application Lab, or by using the **composer** command line.

In a z/OS environment, define a job by using the Dynamic Workload Console connected to a z/OS engine.

### How to define a job using the Dynamic Workload Console

For details about defining jobs from the Dynamic Workload Console, see the section about creating job definitions in *Dynamic Workload Console User's Guide*.

### How to define a job using the composer command line

The composer command line supports the following syntax when defining a job:

#### \$jobs

```
[[folder/]workstation#][folder/]jobname
 {scriptname filename streamlogon username |
  docommand "command" streamlogon username |
  task job_definition }
 [description "description"]
 [tasktype tasktype]
 [interactive]

 [succoutputcond Condition_Name "Condition_Value"]
 [outputcond Condition_Name "Condition_Value"]
```

#### [recovery

```
{stop
 [after [[folder/]workstation#][folder/]jobname]
 [abendprompt "text"]}
|continue
 [after [[folder/]workstation#][folder/]jobname]
 [abendprompt "text"]}
|rerun [same_workstation]
 [[repeatevery hhmm] [for number attempts]]
 [after [[folder/]workstation#][folder/]jobname]
 |[after [[folder/]workstation#][folder/]jobname]
 [abendprompt "text"]}
```

Use the **task** argument, specifying the XML syntax for the specific job plug-in. See the section for each job plug-in for the specific XML syntax.

For a detailed description of the XML syntax, see the section about job definition in *User's Guide and Reference*.

For some jobs a properties file can be generated and used to provide the values for some of the properties defined in the job definition.

The properties file is automatically generated either when you perform a "Test Connection" from the Dynamic Workload Console in the job definition panels, or when you submit the job to run the first time. Once the file has been created, you can customize it. This is especially useful when you need to schedule several jobs of the same type. You can specify the values in the properties file and avoid having to provide information such as credentials and other information, for each job. You can override the values in the properties files by defining different values at job definition time.

## Chapter 3. Scheduling and submitting jobs and job streams

You schedule IBM Workload Scheduler jobs by defining them in job streams.

For distributed environments, use the Dynamic Workload Console or the conman command line.

After you define an IBM Workload Scheduler job, add it to a job stream with all the necessary scheduling arguments and submit it to run. After submission, when the job is running (**EXEC** status), you can kill the IBM Workload Scheduler job if necessary. For some job plug-ins, this action is converted into corresponding action in the plug-in application. Refer to the specific plug-in section for details about what effect the kill action has in the application.

For z/OS environments, use the Dynamic Workload Console or the ISPF application.

### **How to submit a job stream using the Dynamic Workload Console**

To submit a job or job stream to run according to the schedule defined, see the section about submitting workload on request in production in *Dynamic Workload Console User's Guide*. For distributed environments only, see also the section about quick submit of jobs and job streams in *Dynamic Workload Console User's Guide*.

### **How to submit a job stream from the conman command line**

To submit a job stream for processing, see the **submit sched** command. To submit a job to be launched, see the **submit job** command. For more information about these commands see the *IBM Workload Scheduler: User's Guide and Reference*.

### **How to submit your workload using the ISPF application**

The workload is defined by creating one or more calendars, defining applications, creating a long-term plan, and creating a current plan. The current plan is a detailed plan, typically for one day, that lists the applications that run and the operations in each application. See the section about creating the plans for the first time in *Managing the Workload* for more information about creating plans.

## Chapter 4. Monitoring IBM Workload Scheduler jobs

Monitor IBM Workload Scheduler jobs by using the Dynamic Workload Console, the command line, or the ISPF application.

You monitor distributed jobs by using the Dynamic Workload Console connected to a distributed engine, by using the **conman** command line.

You monitor z/OS jobs by using the Dynamic Workload Console connected to a z/OS engine or the ISPF application.

### **How to monitor jobs by using the Dynamic Workload Console**

See the online help or the section about creating a task to monitor jobs in the *Dynamic Workload Console User's Guide*.

### **How to monitor jobs by using conman**

See the section about managing objects in the plan - conman in *User's Guide and Reference*.

### **How to monitor jobs by using the ISPF application**

See the section about monitoring the workload in *IBM® Z Workload Scheduler Managing the Workload*.

## Chapter 5. Analyzing the job log

When a job runs IBM Workload Scheduler creates a job log that you can analyze to verify the job status.

### About this task

For distributed jobs, you analyze the job log by using the Dynamic Workload Console or the **conman** command line.

For z/OS jobs, you analyze the job log by using the Dynamic Workload Console or the ISPF application.

While the job is running, you can track the status of the job and analyze the properties of the job. In particular, in the Extra Information section, if the job contains variables, you can verify the value passed to the variable from the remote system. Some job streams use the variable passing feature, for example, the value of a variable specified in job 1, contained in job stream A, is required by job 2 in order to run in the same job stream.

For more information about passing variables between jobs, see the related section in the IBM Workload Scheduler on-premises online product documentation in IBM Knowledge Center.

### How to analyze the job log using the Dynamic Workload Console

Before you can access the job log for an individual job, you need to run a query and list the jobs for which you want to analyze the job log. See the online help or the section about creating a task to monitor jobs in *Dynamic Workload Console User's Guide*. From the list of jobs resulting from the query, you can either download the job log, or view the job log in the job properties view. Select the job for which you want to analyze the job log and click **More Actions > Download Job Log** or **More Actions > Properties** from the toolbar.

### How to analyze the job log using conman

See the section about the **showjobs** command in *User's Guide and Reference*.

### How to analyze the job log using the ISPF application

See the section about monitoring the workload in *Managing the Workload*.

## Chapter 6. IBM® BigInsights jobs

An IBM® BigInsights job defines, schedules, monitors, and manages IBM® BigInsights Workbook data sheets or applications.

You manage IBM® BigInsights Workbook data sheets or applications in both a distributed and z/OS environment.

IBM Workload Scheduler integrates with IBM® BigInsights for Hadoop to bring the power of Apache Hadoop to the enterprise. With the IBM Workload Scheduler plug-in for BigInsights for Hadoop you can:

- Monitor and control workflows containing IBM® BigInsights workbooks and applications that help enterprise find insights into new and emerging types of data.
- Fully automate IBM® BigInsights process execution with calendar and event-based scheduling, and a single point of control to handle exceptions, and automate recovery processes.

### Prerequisite

Before you can define IBM® BigInsights jobs, you must create a connection between the IBM Workload Scheduler agent and the IBM® BigInsights server.

For information about the supported versions of the job plug-ins, generate a dynamic [Data Integration](#) report from the IBM® Software Product Compatibility Reports web site, and select the Supported Software tab.

### IBM® BigInsights job definition

A description of the job properties and valid values are detailed in the context-sensitive help in the Dynamic Workload Console by clicking the question mark (?) icon in the top-right corner of the properties pane.

For more information about creating jobs using the various supported product interfaces, see [Defining a job on page 19](#).

The following table lists the required and optional attributes for IBM® BigInsights jobs:

**Table 3. Required and optional attributes for the definition of an IBM® BigInsights job**

| Attribute  | Description and value   | Required |
|--|---|----------|
| <b>Connection properties - IBM® BigInsights server section</b> |   |          |
| Hostname   | The hostname of the IBM® BigInsights server.  | ✓        |
| Port   | The port of the IBM® BigInsights server.  | ✓        |
| Protocol   | The protocol for connecting to the IBM® BigInsights server. Supported values are <b>http</b> and <b>https</b> . |          |
| User   | The user to be used for accessing the IBM® BigInsights server.  |          |
| Password   | The password to be used for accessing the IBM® BigInsights server.  |          |
| <b>Connection properties - Retry options section</b>           |   |          |
| Number of retries  | The number of times the program retries performing the operation.   |          |



**Table 3. Required and optional attributes for the definition of an IBM® BigInsights job (continued)**

| Attribute                                      | Description and value  | Required |
|--|--|----------|
| Retry interval (seconds)                       | The number of seconds the program waits before retrying the operation.<br>The default value is 30 seconds. |          |
| <b>Action properties - Workbook section</b>    |  |          |
| Workbook                                       | The name and path to an IBM® BigInsights workbook. Use this option to run a user-specified workbook.       | ✓        |
| <b>Action properties - Application section</b> |  |          |
| Application Identifier                         | The application identifier. Use this option to run an Application.   | ✓        |
| Execution Name                                 | The user-defined identifier for a specific run of the application  |          |

### Scheduling and stopping the job in IBM Workload Scheduler

You schedule IBM Workload Scheduler IBM® BigInsights jobs by defining them in job streams. Add the job to a job stream with all the necessary scheduling arguments and submit the job stream.

You can submit jobs by using the Dynamic Workload Console, Application Lab or the conman command line. See [Scheduling and submitting jobs and job streams on page 21](#) for information about how to schedule and submit jobs and job streams using the various interfaces.

After submission, when the job is running and is reported in **EXEC** status in IBM Workload Scheduler, you can stop it if necessary, by using the **kill** command. However, this action is effective only for the **Wait for a file** action. If you have defined different actions in your job, the **kill** command is ignored.

### Monitoring the job

If the IBM Workload Scheduler agent stops when you submit the IBM Workload Scheduler IBM® BigInsights job or while the job is running, as soon as the agent becomes available again IBM Workload Scheduler begins monitoring the job from where it stopped.

For information about how to monitor jobs using the different product interfaces available, see [Monitoring IBM Workload Scheduler jobs on page 22](#).

### Job properties

While the job is running, you can track the status of the job and analyze the properties of the job. In particular, in the Extra Information section, if the job contains variables, you can verify the value passed to the variable from the remote system. Some job streams use the variable passing feature, for example, the value of a variable specified in job 1, contained in job stream A, is required by job 2 in order to run in the same job stream.

For information about how to display the job properties from the various supported interfaces, see [Analyzing the job log on page 23](#).

For example, from the conman command line, you can see the job properties by running:

```
conman sj <job_name>;props
```

where <job\_name> is the IBM® BigInsights job name.

The properties are listed in the `Extra Information` section of the output command.

For more information about passing variables between jobs, see the related sections in *User's Guide and Reference*.

## Job log content

For information about how to display the job log from the various supported interfaces, see [Analyzing the job log on page 23](#).

For example, you can see the job log content by running `conman sj <job_name>;stdlist`, where <job\_name> is the IBM® BigInsights job name.

## See also

From the Dynamic Workload Console you can perform the same task as described in the *Dynamic Workload Console User's Guide*, section about Creating job definitions.

For more information about how to create and edit scheduling objects, see the *Dynamic Workload Console User's Guide*, section about Designing your Workload.

## Chapter 7. IBM® Cognos jobs

Use the IBM Workload Scheduler plug-in for IBM® Cognos to run IBM® Cognos reports, interactive reports, query, and report views, using IBM Workload Scheduler.

Take advantage of all the IBM Workload Scheduler scheduling capabilities to manage these reports.

You manage these reports both in a distributed and in a z/OS environment, by selecting the appropriate engine.

Any reference in the documentation to reports is intended to mean reports, interactive reports, query, and report views, unless otherwise specified.

For information about the supported versions of the job plug-ins, generate a dynamic [Data Integration](#) report from the IBM® Software Product Compatibility Reports web site, and select the Supported Software tab.

### Business scenario

A retail company has many shops around the world. Each shop has its own local database, which stores daily transactions and tracks the number of articles remaining in stock. The central business division of the company every morning needs to analyze all the reports that show the number of articles sold in every country, grouped by predefined categories.

The company collects this data by using IBM InfoSphere DataStage and creates the reports using IBM® Cognos. Overnight, the company runs the following processes:

- IBM InfoSphere DataStage jobs to collect data from the local database of each store and then, using the procedures stored in the central database, to produce the aggregated data to create the business reports.
- IBM® Cognos jobs to create the business reports to be used by the business analysts.

Both processes are performed manually by an operator. To reduce costs and to ensure that the SLA requirement of having data available every morning is satisfied, the company wants to automate the entire process.

Using IBM Workload Scheduler Plug-in for IBM InfoSphere DataStage and for IBM® Cognos, the company can satisfy this objective because the product provides the plug-in necessary to automate and control the entire process.

### Defining an IBM Workload Scheduler job to run an IBM® Cognos report

Define IBM Workload Scheduler jobs to run IBM® Cognos reports by using one of the supported product interfaces.

In a distributed environment, define an IBM Workload Scheduler job to run an IBM® Cognos report by using the Dynamic Workload Console connected to a distributed engine, by using Application Lab, or using the **composer** command line.

In a z/OS environment, define an IBM Workload Scheduler job to run an IBM® Cognos report by using the Dynamic Workload Console connected to a z/OS engine.

See [Defining a job on page 19](#) for more information about creating jobs using the various interfaces available. Some samples of IBM® Cognos report job definitions are contained in the sections that follow.

## Defining jobs by using the Dynamic Workload Console

You can define IBM Workload Scheduler jobs to run IBM® Cognos reports by using the Dynamic Workload Console.

### About this task

To define a job by using the Dynamic Workload Console, perform the following procedure. See [Defining a job on page 19](#) for information about defining jobs with other available interfaces.

1. In the console navigation tree, expand **Administration > Workload Design** and click **Manage Workload Definitions**.
2. Select an engine and click **Go**. The **Workload Designer** opens.
3. In the Working List panel, select:

#### On z/OS engine:

**New > Business Analytics > Cognos**

#### On a distributed engine:

**New > Job Definition > Business Analytics > Cognos**

The properties of the job are displayed in the right-hand panel for editing.

4. In the properties panel, specify the attributes for the job definition you are creating. You can find detailed information about all the attributes in the help available with the panel. In particular:

#### In the General panel:

##### Environment:

Enter the name of the IBM Workload Scheduler job that runs the IBM® Cognos report.

Enter the name of the workstation where you installed the IBM Workload Scheduler agent.

##### Environment:

Enter the name of the partitioned data set where you want to create the JCL.

Enter the name of the JCL you want to create in the partitioned data set.

Enter the name of the workstation where you installed the IBM Workload Scheduler agent.

#### In the Cognos panel:

##### In the Credentials section:

Enter the namespace and the credentials related to the IBM® Cognos report. If you do not want to specify them here, you can define them in the `CognosJobExecutor.properties` file. In this case IBM Workload Scheduler reads them from the `.properties` file when you retrieve any information by using a list or when you submit the job.

You do not need to specify this value if you set the **true** value for the **Allow anonymous access?** property in the **IBM Cognos Configuration > Local Configuration > Security > Authentication > Cognos** window.

**In the Server connection section:**

Enter the host name or TCP/IP address and the port of the IBM® Cognos server you want to connect to. If you do not want to specify them here, you can define them in the `CognosJobExecutor.properties` file.

Select **Use SSL** connection security to communicate in SSL with the IBM® Cognos server. If you do not select it the communication is HTTP.

**In the Report section:**

Enter the path to the report you want to run, the fully qualified path where you want to save the report, the format in which you want to generate the report and parameters if required for the report.

The path must exist and you must have the permission to write in it otherwise you receive an error message.

When you specify parameters that can have multiple values, use **-Value:** as separator. For example, you can write as follows:

```
Rome-Value:Paris
```

Parameters of type date, time, and time stamp, must be specified using a specific syntax. See [Specifying the parameter format for date, time, and time stamp on page 35](#).

Values for parameters that require parameterized filters must be specified using the procedure described in [Specifying parameterized filters on page 36](#).

**In the Delivery options panel:**

Use this panel to define the options to specify the delivery options for the IBM® Cognos report. If you did not insert a value in the **Output file** field you must enter at least an email address.

5. Click **Save** to save the job definition in the database.

## Job definition for IBM® Cognos reports

Job definition properties and JSDL examples for IBM® Cognos reports.

For more information about creating jobs using the various supported product interfaces, see [Defining a job on page 19](#).

[Table 4: Required and optional attributes for the definition of jobs running IBM Cognos reports. on page 30](#) describes the required and optional attributes for the definition of jobs to run IBM® Cognos reports, together with a description of each attribute.

**Table 4. Required and optional attributes for the definition of jobs running IBM® Cognos reports.**

| Attribute | Description/value   | Required   |
|-----------|---|--|
| Namespace | <p>The IBM® Cognos namespace to log on to. It contains the IBM® Cognos objects, such as groups, roles, data sources, distribution lists, and contacts.</p> <p>You do not have to specify this value if:</p> <ul style="list-style-type: none"> <li>• You specified it in the<br/>Cognos<br/>JobExecutor<br/>.properties file.</li> <li>• You set the <b>true</b> value for the <b>Allow anonymous access?</b> property in the <b>IBM Cognos Configuration &gt; Local Configuration &gt; Security &gt; Authentication &gt; Cognos</b> window.</li> </ul> |  |
| UserName  | <p>The user to use when logging on to the namespace.</p>  | ✓  |
|           |   | <p>You do not have to specify this value if:</p> <ul style="list-style-type: none"> <li>• You specified it in the<br/>Cognos<br/>JobExecutor<br/>.properties file.</li> <li>• You set the <b>true</b> value for the <b>Allow anonymous access?</b> property in the <b>IBM Cognos Configuration &gt; Local Configuration &gt; Security &gt; Authentication &gt; Cognos</b> window.</li> </ul> |
| password  | <p>The password of the authorized user. It is encrypted when you submit the job.</p> <p>You do not have to specify this value if:</p> <ul style="list-style-type: none"> <li>• You specified it in the<br/>Cognos<br/>JobExecutor<br/>.properties file.</li> </ul>  |  |

Table 4. Required and optional attributes for the definition of jobs running IBM® Cognos reports. (continued)

| Attribute     | Description/value   | Required |
|---------------|---|----------|
| serverAddress | <ul style="list-style-type: none"> <li>• You set the <b>true</b> value for the <b>Allow anonymous access?</b> property in the <b>IBM Cognos Configuration &gt; Local Configuration &gt; Security &gt; Authentication &gt; Cognos</b> window.</li> </ul> <p>The host name or TCP/IP address of the IBM® Cognos server you want to connect to.</p> <p>You do not have to specify this value if:</p> <ul style="list-style-type: none"> <li>• You specified it in the<br/>Cognos<br/>JobExecutor<br/>.properties file.</li> <li>• You set the <b>true</b> value for the <b>Allow anonymous access?</b> property in the <b>IBM Cognos Configuration &gt; Local Configuration &gt; Security &gt; Authentication &gt; Cognos</b> window.</li> </ul> |          |
| port          | <p>The port to use for the connection. The default value is <b>9300</b>. If you select Use SSL, the default is <b>9334</b>. For detailed information, see the IBM® Cognos documentation.</p> <p>You do not have to specify this value if:</p> <ul style="list-style-type: none"> <li>• You specified it in the<br/>Cognos<br/>JobExecutor<br/>.properties file.</li> <li>• You set the <b>true</b> value for the <b>Allow anonymous access?</b> property in the <b>IBM Cognos Configuration &gt; Local Configuration &gt; Security &gt; Authentication &gt; Cognos</b> window.</li> </ul>   |          |

**Table 4. Required and optional attributes for the definition of jobs running IBM® Cognos reports. (continued)**

| Attribute        | Description/value  | Required |
|------------------|--|----------|
| SslCheck         | Specify it to use SSL connection security to communicate with the IBM® Cognos server. If you do not specify it the communication is HTTP.  |          |
| reportPath       | The path to the report that you want to run. ✓   |          |
| parametersValues | <p>The list of parameters to associate to the job.</p> <p>When you specify parameters that can have multiple values, use <b>-Value:</b> as separator. For example, you can write as follows:</p>   |          |
|                  | <pre>Rome-Value:Paris</pre>  |          |
|                  | <p>Parameters of type date, time, and time stamp, must be specified using a specific syntax. See <a href="#">Specifying the parameter format for date, time, and time stamp on page 35</a>.</p>  |          |
|                  | <p>Values for parameters that require parameterized filters must be specified using the procedure described in <a href="#">Specifying parameterized filters on page 36</a>.</p>  |          |
| outputFile       | <p>The fully qualified path where you want to save the report. The path must exist and you must have the permission to write in it. The report is saved with the extension corresponding to the format you specified. IBM Workload Scheduler saves, in the path you specify, the report with its content. You must specify at least the path or an email address for the delivery options otherwise you receive an error message when you save the job definition.</p> |          |
| formatTypes      | <p>The format in which you want to generate the report.</p>  |          |



**Table 4. Required and optional attributes for the definition of jobs running IBM® Cognos reports. (continued)**

| Attribute  | Description/value  | Required |
|------------|--|----------|
|            | <p>For reports, supported formats are:</p> <ul style="list-style-type: none"> <li>• CSV</li> <li>• Excel 2002</li> <li>• Excel 2007</li> <li>• HTML</li> <li>• HTML Fragment</li> <li>• HTML Web Archive</li> <li>• PDF</li> <li>• XML</li> </ul> <p>For interactive reports and views of interactive reports you can use only the HTML format. Even if, for a view of an interactive report, you select a format different from HTML, the product saves the output in HTML format when the job runs.</p> <p>The default value is <b>HTML</b>.</p> |          |
| emailGroup | <p>The delivery options for the IBM® Cognos report. If you did not insert a value for the <b>Output file</b> attribute, you must enter at least an email address. The email delivery status does not impact the job completion status.</p> <p><b>To, Cc, Bcc</b></p> <p>The email addresses to which you want to send the report. Address the message by typing at least an email address in one of the address fields, To, Cc (carbon copy), or Bcc (blind carbon copy). To specify multiple addresses divide them by using commas.</p>           |          |

**Table 4. Required and optional attributes for the definition of jobs running IBM® Cognos reports. (continued)**

| Attribute | Description/value         | Required |
|-----------|---------------------------|----------|
|           | <b>Subject</b>            |          |
|           | The subject of the email. |          |
|           | <b>Body</b>               |          |
|           | The body of the email.    |          |

The following example shows the job definition for an IBM® Cognos report with only the required attributes specified:

```

$JOBS
NC125152#COGNOS_ONLY_REQUIRED_FIELDS
TASK
  <?xml version="1.0" encoding="UTF-8"?>
<jSDL:jobDefinition xmlns:jSDL="http://www.abc.com/xmlns/prod/scheduling/1.0/jSDL"
xmlns:jSDLCognos="http://www.abc.com/xmlns/prod/scheduling/1.0/jSDLCognos" name="COGNOS">
  <jSDL:application name="cognos">
    <jSDLCognos:cognos>
      <jSDLCognos:CognosParameters>
        <jSDLCognos:CognosPanel>
          <jSDLCognos:credentialsGroup>
            <jSDLCognos:namespace/>
            <jSDLCognos:userName/>
            <jSDLCognos:password/>
          </jSDLCognos:credentialsGroup>
          <jSDLCognos:serverConnectionGroup>
            <jSDLCognos:serverAddress/>
            <jSDLCognos:port/>
            <jSDLCognos:CheckSSLGroup/>
          </jSDLCognos:serverConnectionGroup>
          <jSDLCognos:reportGroup>
            <jSDLCognos:ReportPathGroup>
              <jSDLCognos:reportPath>
                Address Report - Path:/content/package[@name='twS4apps']
                /report[@name='Address Report']
              </jSDLCognos:reportPath>
            </jSDLCognos:ReportPathGroup>
            <jSDLCognos:outputFile>C:\outputFile\jSDLCognos:outputFile>
            <jSDLCognos:formatTypes>PDF/jSDLCognos:formatTypes>
          </jSDLCognos:reportGroup>
        </jSDLCognos:CognosPanel>
        <jSDLCognos:OptionPanel>
          <jSDLCognos:emailGroup>
            <jSDLCognos:toAddress/>
            <jSDLCognos:ccAddress/>
            <jSDLCognos:bccAddress/>
            <jSDLCognos:subject/>
            <jSDLCognos:body/>
          </jSDLCognos:emailGroup>
        </jSDLCognos:OptionPanel>
      </jSDLCognos:CognosParameters>
    </jSDLCognos:cognos>
  </jSDL:application>
</jSDL:jobDefinition>
RECOVERY STOP

```

The following example shows the job definition for an IBM® Cognos report with all the attributes specified:

```

$JOBS
NC125152#REPFOREUROPEBUSINESS COGNOS_ALL_FIELDS

```

## TASK

```

<?xml version="1.0" encoding="UTF-8"?>
<jSDL:jobDefinition xmlns:jSDL="http://www.abc.com/xmlns/prod/scheduling/1.0/jSDL"
xmlns:jSDLCognos="http://www.abc.com/xmlns/prod/scheduling/1.0/jSDLCognos" name="COGNOS">
  <jSDL:application name="cognos">
    <jSDLCognos:cognos>
      <jSDLCognos:CognosParameters>
        <jSDLCognos:CognosPanel>
          <jSDLCognos:credentialsGroup>
            <jSDLCognos:namespace>NTLM/jSDLCognos:namespace>
            <jSDLCognos:userName>Administrator/jSDLCognos:userName>
            <jSDLCognos:password>{aes}SgB6gmS+3xj0Yq2QsINV0tsNCeZIIsmwt08kw06ZCR4=
              </jSDLCognos:password>
            </jSDLCognos:credentialsGroup>
            <jSDLCognos:serverConnectionGroup>
              <jSDLCognos:serverAddress>nc112006/jSDLCognos:serverAddress>
              <jSDLCognos:port>9300/jSDLCognos:port>
              <jSDLCognos:CheckSSLGroup>
                <jSDLCognos:SslCheck/>
              </jSDLCognos:CheckSSLGroup>
            </jSDLCognos:serverConnectionGroup>
            <jSDLCognos:reportGroup>
              <jSDLCognos:ReportPathGroup>
                <jSDLCognos:reportPath>date and time report - in values -
                  Path:/content/package[@name='cognosTime']/interactiveReport
                    [@name='date and time report - in values']
                </jSDLCognos:reportPath>
              </jSDLCognos:ReportPathGroup>
            <jSDLCognos:parametersValues>
              <jSDLCognos:parametersValue key="Date prompt">Between 2012-02-03 and 2012-04-15
                </jSDLCognos:parametersValue>
              <jSDLCognos:parametersValue key="Time prompt">-Value:01:00:00-Value:01:01:01
                </jSDLCognos:parametersValue>
              <jSDLCognos:parametersValue key="Date and time prompt">
                2012-02-03 15:05:00-Value:2012-02-03T16:01:00-Value:2012-02-03T16:00:00
                </jSDLCognos:parametersValue>
            </jSDLCognos:parametersValues>
            <jSDLCognos:outputFile>C:\Cognos reports\ReportForEuropeBusiness
              </jSDLCognos:outputFile>
            <jSDLCognos:formatTypes>HTML/jSDLCognos:formatTypes>
          </jSDLCognos:reportGroup>
        </jSDLCognos:CognosPanel>
      <jSDLCognos:OptionPanel>
        <jSDLCognos:emailGroup>
          <jSDLCognos:toAddress>gsg@it.abc.com,igg@it.im.com/jSDLCognos:toAddress>
          <jSDLCognos:ccAddress>ibf@it.abc.com/jSDLCognos:ccAddress>
          <jSDLCognos:bccAddress>igg@it.abc.com/jSDLCognos:bccAddress>
          <jSDLCognos:subject>Report from Cognos/jSDLCognos:subject>
          <jSDLCognos:body>Report generated by Cognos:/jSDLCognos:body>
        </jSDLCognos:emailGroup>
      </jSDLCognos:OptionPanel>
    </jSDLCognos:CognosParameters>
  </jSDLCognos:cognos>
</jSDL:application>
</jSDL:jobDefinition>
RECOVERY STOP

```

## Specifying the parameter format for date, time, and time stamp

When defining reports either using the Dynamic Workload Console, or **composer**, specify parameters of type date, time, and time stamp, using a specific syntax.

The following table shows the syntax you must use when defining reports containing date, time, and time stamp formats as parameters.

**Table 5. Examples to use for parameters of date, time, and time stamp formats**

| Pro<br>mpt<br>type | Cognos®<br>parameter format                      | Cognos® parameter format examples |  |   |
|--------------------|--|-----------------------------------|--|---|
|                    |  | Single value                      | List of values   | Interval values                                     |
| Date               | CCYY-MM-DD                                       | 2012-02-03                        | 2012-02-03-Value:2012-03-14  | Between 2012-02-03 and 2012-04-15                   |
| Time               | hh:mm:ss   | 01:00:00                          | 01:00:00-Value:01:01:01  | Between 01:00:00 and 23:59:30                       |
| Time<br>Stamp      | CCYY-MM-DDThh:mm:ss<br>or<br>CCYY-MM-DD hh:mm:ss | 2012-02-03<br>15:05:00            | 2012-02-03<br>15:05:00-Value:2012-02-03T16:01:00-Value:2012-02-03T16:00:00 | Between 2012-02-03 15:05:00 and 2012-04-15T16:00:00 |



**Note:** You must specify the parameter format exactly as they are shown in the table respecting lower case and upper case formats.

## Specifying parameterized filters

When defining reports that use parameterized filters either using the Dynamic Workload Console, or **composer**, for the value, use the one reported in the Cognos® Report Studio.

### About this task

The following example demonstrates how to specify parameters that use parameterized filters by using the Dynamic Workload Console:

1. In the **Properties - Cognos** page of the Workload Designer in the Dynamic Workload Console, click the **Cognos** tab.
2. Select the name of the parameter you want to specify for the report.
3. In the Report section, click the addition (+) symbol for Parameter list to add a new parameter.
4. In the **Name** field, type the name of the parameter you want to specify for the report.
5. In the **Value** field, type the value reported in the Cognos® Report Studio. To identify the value proceed as follows:
  - a. Open Report Studio.
  - b. Open the report to run.
  - c. In the Insertable Objects pane, select the filter you want to use. The **Properties** page is displayed.
  - d. Select the **Ref** value.

This example shows how to run the Cognos® Employee Training by Year sample report, specifying for the **?pYear?** parameter the value associated with the filter **2018**. The Employee Training by Year sample report is located under / Samples/Models/Dashboard Objects. To run the report proceed as follows:

1. In the Insertable Objects pane, select the **2018** filter. The Properties panel is displayed.
2. Select **[go\_data\_warehouse].[2018]**.
3. Insert **[go\_data\_warehouse].[2018]** in the **Value** field.
4. Save the job definition.

To specify parameters that use parameterized filters using **composer**, perform the following procedure.

1. Open Report Studio.
2. Open the report to run.
3. In the Insertable Objects pane, select the filter you want to use. The Properties panel is displayed.
4. Select the **Ref** value.
5. Copy this value in the **<jsdlcognos:parametersValues>** attribute. Below an example for the Employee Training by Year sample report specifying for the **?pYear?** parameter the value associated with the filter **2018**:

```
<jsdlcognos:reportGroup>
  <jsdlcognos:ReportPathGroup>
    <jsdlcognos:reportPath>
      Employee Training - Path:/content/folder[@name='Samples']
                               /folder[@name='Models']
                               /folder[@name='Dashboard Objects']
                               /report[@name='Employee Training']
    </jsdlcognos:reportPath>
  </jsdlcognos:ReportPathGroup>
  <jsdlcognos:parametersValues>
    <jsdlcognos:parametersValue>
      key="pYear">[go_data_warehouse].[2018]
    </jsdlcognos:parametersValue>
  </jsdlcognos:parametersValues>
  <jsdlcognos:outputFile>
    C:\Cognos reports\Employee Training
  </jsdlcognos:outputFile>
  <jsdlcognos:formatTypes>HTML</jsdlcognos:formatTypes>
</jsdlcognos:reportGroup>
```

## Scheduling and submitting job streams for IBM® Cognos reports

You schedule IBM Workload Scheduler jobs for IBM® Cognos reports by defining them in job streams.

See [Scheduling and submitting jobs and job streams on page 21](#) for information about how to schedule and submit jobs and job streams using the various interfaces.

After you define an IBM Workload Scheduler job for an IBM® Cognos report, add it to a job stream with all the necessary scheduling arguments and submit it. After submission, when the job is running (**EXEC** status), you can kill the IBM Workload Scheduler job that runs the IBM® Cognos report if necessary. In particular, for IBM® Cognos jobs this action is converted into a **Cancel** action for the IBM® Cognos report.

The agent might become unavailable while the IBM Workload Scheduler job running the IBM® Cognos report is running. When the agent becomes available again, IBM Workload Scheduler starts to monitor the report from where it stopped.

For information about monitoring jobs and job streams, see [Monitoring IBM Workload Scheduler jobs on page 22](#).

For information about analyzing the job log, see [Analyzing the job log on page 23](#).

## Customizing IBM Workload Scheduler to run IBM® Cognos reports

You can customize IBM Workload Scheduler to run IBM® Cognos report by using the `CognosJobExecutor.properties` file.

The `CognosJobExecutor.properties` file is a text file that contains the server credentials, the authentication information, and the dispatch servlet name you specified when configuring the IBM® Cognos product.

The properties file is automatically generated either when you perform a "Test Connection" from the Dynamic Workload Console in the job definition panels, or when you submit the job to run the first time. Once the file has been created, you can customize it. This is especially useful when you need to schedule several jobs of the same type. You can specify the values in the properties file and avoid having to provide information such as credentials and other information, for each job. You can override the values in the properties files by defining different values at job definition time.

The file is located in the directory:

```
agent_install_dir/TWA/TWS/JavaExt/cfg
```

Where `agent_install_dir` is the path where you installed the IBM Workload Scheduler dynamic agent or the IBM Z Workload Scheduler agent. Where `agent_install_dir` is the path where you installed the IBM Workload Scheduler dynamic agent.

You can define the properties contained in the `.properties` file, except the `dispatchServlet` value, at job definition time also. In this case, IBM Workload Scheduler uses the values you specify at job definition time for running the report. [Table 6: Properties for running IBM Cognos reports on page 38](#) describes the properties contained in `CognosJobExecutor.properties`.

**Table 6. Properties for running IBM® Cognos reports**

| Property  | Description/value   | Required |
|-----------|---|----------|
| namespace | The IBM® Cognos namespace to log on to.<br><br>You do not need to specify this value if you set the <b>true</b> value for the <b>Allow anonymous access?</b> property in the <b>IBM Cognos Configuration &gt; Local Configuration &gt; Security &gt; Authentication &gt; Cognos</b> window.           |          |
| username  | The user to use when logging on to the namespace.<br><br>You do not need to specify this value if you set the <b>true</b> value for the <b>Allow anonymous access?</b> property in the <b>IBM Cognos Configuration &gt; Local Configuration &gt; Security &gt; Authentication &gt; Cognos</b> window. |          |

**Table 6. Properties for running IBM® Cognos reports (continued)**

| Property        | Description/value  | Required |
|-----------------|--|----------|
| password        | The password of the authorized user. It is encrypted in the agent configuration file when you retrieve any information by using a list, or when you submit the report.<br><br>You do not need to specify this value if you set the <b>true</b> value for the <b>Allow anonymous access?</b> property in the <b>IBM Cognos Configuration &gt; Local Configuration &gt; Security &gt; Authentication &gt; Cognos</b> window. |          |
| serverAddress   | The host name or TCP/IP address of the Cognos server you want to connect to.   |          |
| serverPort      | The port to use for the connection. The default value is <b>9300</b> . If you use SSL, the default is <b>9334</b> .  |          |
| dispatchServlet | The dispatch you specified in the <b>IBM Cognos Configuration &gt; Environment &gt; Dispatcher Settings</b> window. The default value is <b>/p2pd/servlet/dispatch</b> .   | ✓        |

**Example****Example**

This example shows a `CognosJobExecutor.properties` file.

```
namespace=cognosNamespace
username=userName
password=userPwd
serverAddress=nc112006
serverPort=9300
dispatchServlet=/p2pd/servlet/dispatch
```

**Configuring the agent to use Cognos in SSL**

Configure the IBM Workload Scheduler agent to connect to an IBM® Cognos server that is using SSL.

**About this task**

To configure the agent to connect to an IBM® Cognos server that is using SSL, perform the following procedure.



**Note:** On Windows operating systems, path with blanks must be specified between double quotes.

1. On the IBM® Cognos server, run the following command to export the certificate:

**On Windows operating systems:**

```
<Cognos_inst_path>\bin\ThirdPartyCertificateTool.bat -E -T
-r \<certificate_dir>\<certificate_name>
```

```
-k <Cognos_inst_path>\configuration\signkeypair\jCAKeystore
-p <cognos_keystore_password>
```

**On UNIX and Linux operating systems:**

```
<Cognos_inst_path>/bin/ThirdPartyCertificateTool -E -T
-r /<certificate_dir>/<certificate_name>
-k <Cognos_inst_path>/configuration/signkeypair/jCAKeystore
-p <cognos_keystore_password>
```

where:

**cognos\_inst\_path**

Specify the path where you installed the IBM® Cognos server.

**certificate\_dir**

Specify the directory in which to export the IBM® Cognos certificate.

**certificate\_name**

Specify the name of the IBM® Cognos certificate you export.

**cognos\_keystore\_password**

Specify the IBM® Cognos password defined in the **IBM Cognos Configuration > Security > Cryptography > Cognos - Certificate Authority settings - Certificate Authority key store password**.

For example, if you installed the IBM® Cognos server on a UNIX operating system in the `/opt/abc/Cognos/c10` path, you want to export the `/tmp/cacert.cer` certificate and the Certificate Authority key store password is **pass00w0rd**, run the command as follows:

```
/opt/abc/cognos/c10/bin/ThirdPartyCertificateTool.sh -E -T
-r /tmp/cacert.cer
-k /opt/abc/cognos/c10/configuration/signkeypair/jCAKeystore
-p pass00w0rd
```

2. On the agent, run the following command to import the certificate into the agent keystore:

**On Windows operating systems:**

```
<agent_inst_path>\TWS\JavaExt\jre\jre\bin\keytool -import
-file <exp_certificate_dir>\<certificate_name>
-keystore <agent_inst_path>\TWS\JavaExt\jre\jre\lib\security\cacerts
-storepass <keystore_password> -alias Cognos10
```

**On UNIX and Linux operating systems:**

```
<agent_inst_path>/TWS/JavaExt/jre/jre/bin/keytool -import
-file <exp_certificate_dir>/<certificate_name>
-keystore <agent_inst_path>/TWS/JavaExt/jre/jre/lib/security/cacerts
-storepass <keystore_password> -alias Cognos10
```

where:

**agent\_inst\_path**

Specify the path where you installed the agent.



**exp\_certificate\_dir**

Specify the directory where you stored the exported IBM® Cognos certificate.

**certificate\_name**

Specify the certificate you want to import.

**keystore\_password**

Specify the keystore password of the Java extension. The default is **changeit**.

For example, if you installed the agent on a Windows operating system in the `D:\TWS\Engine\tws_user\` path, you want to import the **cacert.cer** certificate in the `c:\app\certificate\` directory, and the password of the agent keystore is **a0password**, run the command as follows:

```
D:\TWS\Engine\tws_user\TWS\JavaExt\jre\jre\bin\keytool
-import -file c:\app\certificate\cacert.cer
-keystore D:\TWS\Engine\tws_user\TWS\JavaExt\jre\jre\lib\security\cacerts
-storepass a0password -alias Cognos10
```

3. In the agent `JobManager.ini` configuration file, add the **JVMOptions** parameter as follows:

```
JVMOptions = -Djavax.net.ssl.trustStore=
"<agent_inst_path>\TWS\JavaExt\jre\jre\lib\security\cacerts"
-Djavax.net.ssl.trustStorePassword=<keystore_password>
```

**On Windows operating systems:**

```
JVMOptions = -Djavax.net.ssl.trustStore=
"<agent_inst_path>\TWS\JavaExt\jre\jre\lib\security\cacerts"
-Djavax.net.ssl.trustStorePassword=<keystore_password>
```

**On UNIX and Linux operating systems:**

```
JVMOptions = -Djavax.net.ssl.trustStore=
"<agent_inst_path>/TWS/JavaExt/jre/jre/lib/security/cacerts"
-Djavax.net.ssl.trustStorePassword=<keystore_password>
```

where:

**agent\_inst\_path**

Specify the path where you installed the agent.

**keystore\_password**

Specify the keystore password of the Java extension.

For example, if you installed the agent on a Windows operating system in the `D:\TWS\Engine\tws_user\` path, the agent keystore path is `D:\TWS\Engine\tws_user\TWS\JavaExt\jre\jre\lib\security\cacerts` and the password agent keystore is **a0password**, add the **JVMOptions** parameter as follows:

```
JVMOptions = -Djavax.net.ssl.trustStore=
"D:\TWS\Engine\tws_user\TWS\JavaExt\jre\jre\lib\security\cacerts"
-Djavax.net.ssl.trustStorePassword=a0password
```

4. Start and stop the agent using the `ShutdownLwa` and `StartUpLwa` commands. See the sections about the commands in *User's Guide and Reference*.

## Mapping between job statuses and IBM® Cognos report statuses

Map job status to IBM® Cognos report status to understand their processing.

[Table 7: Mapping between IBM Workload Scheduler job statuses and IBM Cognos report statuses on page 42](#) table shows how you can map the job status to the IBM® Cognos report status based on the return code you find in the job log output.

**Table 7. Mapping between IBM Workload Scheduler job statuses and IBM® Cognos report statuses**

| IBM® Cognos report status | Dynamic Workload Console and Application Lab job status | IBM Workload Scheduler job status | IBM Z Workload Scheduler job status |
|---------------------------|---|-----------------------------------|-------------------------------------|
| Executing                 | Running   | EXEC                              | Executing                           |
| Pending                   | Running   | EXEC                              | Executing                           |
| Succeeded                 | Successful  | SUCC                              | Completed                           |
| Failed                    | Error   | ABEND                             | Error                               |
| Canceled                  | Error   | ABEND                             | Error                               |
| Suspended                 | Running   | EXEC                              | Executing                           |

## Job log output

The IBM Workload Scheduler for IBM® Cognos report job log and content.

### Purpose

The output of an IBM Workload Scheduler job for IBM® Cognos report shows:

#### Environment:

- In the first part the JSDL definition you submitted.
- In the second part how the job completed.

See [Sample job log output on page 42](#).

#### Environment:

How the job completed. See [Sample job log in a z/OS environment on page 44](#).

For information about accessing the job log, see [Analyzing the job log on page 23](#)

### Example

### Sample job log output

This example shows the output of a job that run on a dynamic agent that completed successfully:

```

%sj NC125152#JOBS.REPOR1722160684;std
=====
= JOB      : NC125152#JOBS[(0000 02/27/12),(JOBS)].REPOR1722160684
= TASK     : <?xml version="1.0" encoding="UTF-8">
<jSDL:jobDefinition xmlns:jSDL="http://www.abc.com/xmlns/prod/scheduling/1.0/jSDL"
  xmlns:jSDLcognos="http://www.abc.com/xmlns/prod/scheduling/1.0/jSDLcognos"
  name="COGNOS">
  <jSDL:application name="cognos">
<jSDLcognos:cognos>
  <jSDLcognos:CognosParameters>
    <jSDLcognos:CognosPanel>

.....
.....

</jSDL:jobDefinition>
= TWSRCMAP :
= AGENT    : NC125152
= Job Number: 1060841359
= Mon Feb 27 17:22:30 CET 2012
=====
AWKCGE050I The IBM Cognos report with path
"/content/package[@name='twS4apps']/report[@name='Address Report']" started
running.
AWKCGE051I The IBM Cognos report with path "/content/package[@name='twS4apps']
/report[@name='Address Report']" completed successfully.
AWKCGE053I The IBM Cognos report results were sent by email to
"joedoe@busy.company.com".
AWKCGE052I The IBM Cognos report results were saved in the file
"C:\Cognos reports\ReportForEuropeBusiness.html".
=====
= Exit Status      : 0
= Elapsed Time (Minutes) : 1
= Mon Feb 27 17:22:44 CET 2012
=====

```

This example shows the output of a job that runs on a dynamic agent that completed with errors:

```

%sj NC125152#JOBS.REPOR1726171742;std
=====
= JOB      : NC125152#JOBS[(0000 02/27/12),(JOBS)].REPOR1726171742
= TASK     : <?xml version="1.0" encoding="UTF-8"?>
<jSDL:jobDefinition xmlns:jSDL="http://www.abc.com/xmlns/prod/scheduling/1.0/jSDL"
  xmlns:jSDLcognos="http://www.abc.com/xmlns/prod/scheduling/1.0/jSDLcognos"
  name="COGNOS">
  <jSDL:application name="cognos">
    <jSDLcognos:cognos>
.....
.....

</jSDL:jobDefinition>
= TWSRCMAP :
= AGENT    : NC125152
= Job Number: 1060841360
= Mon Feb 27 17:26:30 CET 2012
=====
AWKCGE050I The IBM Cognos report with path "/content/package[@name='cognosTime']

```

```
/interactiveReport[@name='date and time report']" started running.  
AWKCGE056E The IBM Cognos report completed with errors.  
=====  
= Status Message: AWKCGE056E The IBM Cognos report completed with errors.  
= Exit Status      : -1  
= Elapsed Time (Minutes) : 1  
= Mon Feb 27 17:26:37 CET 2012  
=====
```

## Example

### Sample job log in a z/OS environment

This example shows the output of a job that run on a dynamic agent that completed successfully:

```
AWKCGE050I The IBM Cognos report with path  
"/content/folder[@name='Samples']/folder[@name='Models']  
/package[@name='GO Data Warehouse\  
(query)']/folder[@name='Report Studio Report Samples']  
/report[@name='Total Revenue by Country']"  
started running.  
AWKCGE051I The IBM Cognos report with path  
"/content/folder[@name='Samples']/folder[@name='Models']  
/package[@name='GO Data Warehouse\  
(query)']/folder[@name='Report Studio Report Samples']  
/report[@name='Total Revenue by Country']"  
completed successfully.  
AWKCGE052I The IBM Cognos report results were saved in the file "c:\addrep1.csv".  
AWKCGE053I The IBM Cognos report results were sent by email to  
"ri.val@busy.company.com".
```

This example shows the output of a job that run on a dynamic agent that completed with errors:

```
AWKCGE050I The IBM Cognos report with path  
"/content/package[@name='tw4apps']  
/folder[@name='Reports with parameters and prompts']  
/interactiveReport[@name='Report 7 with special chars']" started running.  
AWKCGE056E The IBM Cognos report completed with errors.
```

## Part III. Access methods

Access methods are used to extend the job scheduling functions of IBM Workload Scheduler to other systems and applications. They run on extended agents, dynamic agents, and IBM Z Workload Scheduler agents. They enable communication between external systems (SAP R/3, z/OS) and IBM Workload Scheduler and launch jobs and return the status of jobs.

For information about the supported versions of the plug-ins and access methods, run the [Data Integration](#) report and select the **Supported Software** tab.

## Chapter 8. Installing and configuring the access methods

The access methods documented in this guide are packaged with IBM Workload Scheduler and are automatically installed with the product on dynamic and fault-tolerant agents.

**!** **Important:** In order to be entitled to use the access methods and plug-ins, you must have purchased at least one of the following offerings: IBM Workload Scheduler, IBM Workload Scheduler for Applications, or IBM Z Workload Scheduler Agent. See the IBM Workload Scheduler Download document for details: [IBM Workload Scheduler download document](#). For information about the supported versions of the plug-ins and access methods, open the [Data Integration](#) report and select the **Supported Software** tab.

For details about installing an IBM Workload Scheduler dynamic or fault-tolerant agent, see IBM® Workload Scheduler Planning and Installation.

To use any of the access methods on supported agents, you create an options file, which configures the access method and defines the workstation and the jobs that extend the scheduling capability to external systems or applications.

Starting from version 9.5, Fix Pack 2, the prerequisite scan no longer verifies the presence on the local system of 32-bit libraries. However, the extended agent for MVS requires a set of libraries on Linux PPC. You can find the updated list of libraries, in addition to a detailed list of supported operating systems and the most up-to-date product prerequisites, in [IBM Workload Scheduler Detailed System Requirements](#).

### Setting options for the access methods

An options file is a text file located in the `methods` directory of the IBM Workload Scheduler installation, containing a set of options to customize the behavior of the access method. The options must be written one per line and have the following format (with no spaces included):

```
option=value
```

All access methods use two types of options files: a global options file and one or more local options files. The names of the local options files are generically referred to as `XA_Unique_ID_accessmethod.opts` on extended agents and `DYNAMIC_AGENT_FILE_accessmethod.opts` on dynamic agents. The file names specified for the local options files for both types of agents must respect the following rules:

- Both `XA_Unique_ID` and `DYNAMIC_AGENT_FILE` in the file name must be uppercase alphanumeric characters. See specific requirements about `XA_Unique_ID` in [XA\\_Unique\\_ID on page 49](#).
- Double-byte character set (DBCS), single-byte character set (SBCS), and bidirectional text are not supported. For information about acceptable values for the extended agent workstation name, See [Table 8: How to complete the extended agents definition on page 56](#).

#### Dynamic agents and IBM Z Workload Scheduler agents

## Global options file

A common configuration file created by default for each access method installed, whose settings apply to all the dynamic agent workstations defined for that method. When the global options file is created, it contains only the **LJuser** option, which represents the operating system user ID used to launch the access method. You can customize the global options file by adding the options appropriate for the access method.

The name of the global options file is `accessmethod.opts`, which, depending on your operating system, corresponds to:

### For PeopleSoft

`psagent.opts`

### For SAP

`r3batch.opts`

### For z/OS

`mvsjes.opts, mvsopc.opts`

## Local options file

One or more configuration files that are specific to each access method. The name of this file is `optionsfile_accessmethod.opts` and they are saved to the path `TWA_DATA_DIR/methods`.

### In a distributed environment

- If you are defining a job to run the access method by using the Dynamic Workload Console, it is the options file you specify in the **New > Job definition > ERP > Access Method XA** Task tab.
- If you are defining the SAP job to run the access method by using the Dynamic Workload Console, it is the options file you specify in the **New > Job definition > ERP > SAP Job on Dynamic Workstations XA** Task tab.
- If you are defining the job to run the access method by using **composer**, it is the options file you specify in the **target** attribute of the job definition.

If you do not create a local options file, the global options file is used.

**In a z/OS® environment**

- If you are defining a job to run the access method by using the Dynamic Workload Console, it is the options file you specify in the **New > ERP > Access Method XA** Task tab.
- If you are defining the SAP job to run the access method by using the Dynamic Workload Console, it is the options file you specify in the **New > ERP > SAP XA** Task tab.
- If you are defining the job to run the access method by using the **JOBREC** statement, it is the name of the workstation where the access method runs.

If you do not create a local options file, the global options file is used.

If you do not specify an option in the `optionsfile_accessmethod.opts` file, while the access method is running, the product uses the values specified for that option in the global options file. If you do not specify options either in the `optionsfile_accessmethod.opts` or in the global option file, the product issues an error message.

If the SAP access method is installed for `AGENT1` workstation, with unique identifier, S4HANAR3BW, but you have two external SAP systems on which to schedule jobs, then in the `TWA_DATA_DIR/methods` directory, you create the following options files:

- `SAP1_S4HANAR3BW_r3batch.opts`
- `SAP2_S4HANAR3BW_r3batch.opts`

Each file contains the options specific to each external SAP system, for example, the connection information.

For pools and dynamic pools containing  $n$  agents, you must create an options file for the dynamic pool and copy it in the `TWA_DATA_DIR/methods` of each agent of the pool so that all members of the pool have a local options file with the same name. Then you must create another options file for the specific agent in the same directory. For example, if the SAP access method is installed for `AGENT1` and `AGENT2` which belong to the dynamic pool `DYN_POOL`, create in the `TWA_DATA_DIR/methods` directory of each agent the following options files:

**AGENT1**

- `FILEOPTS_AGENT1_r3batch.opts`
- `FILEOPTS_DYN_POOL_r3batch.opts`

**AGENT2**

- `FILEOPTS_AGENT2_r3batch.opts`
- `FILEOPTS_DYN_POOL_r3batch.opts`



## Extended agents

All access methods use two types of options file:

### Global options file

A common configuration file created by default for each access method installed, whose settings apply to all the extended agent workstations defined for that method. When the global options file is created, it contains only the **LJuser** option, which represents the operating system user ID used to launch the access method. You can customize the global options file by adding the options appropriate to the access method.

The name of the global options file is `accessmethod.opts`, which, depending on your operating system, corresponds to:

#### For PeopleSoft

`psagent.opts`

#### For SAP

`r3batch.opts`

#### For z/OS

`mvsjes.opts`, `mvsopc.opts`

#### For custom access methods

`netmth.opts`

### Local options file

A configuration file that is specific to each extended agent workstation within a particular installation of an access method. The name of this file is `XA_Unique_ID_accessmethod.opts`, where:

#### ***XA\_Unique\_ID***

The unique identifier of the workstation in the plan. Since the folder feature was introduced, workstations can be defined in folders, therefore, the workstation name alone, is not sufficient to identify a workstation in the plan, but instead, the name and folder combination is mapped to a unique identifier. In the `localopts` file, the value of the `this_cpu` option is the unique identifier of the workstation. You can also verify the unique identifier for a workstation by submitting the `composer list` command with the `;showid` filter. Should this result in blank, `XA_Unique_ID` corresponds to the workstation name. You can also retrieve the unique identifier submitting the `conman showcpus` command with the `;showid` filter. For example, if the installation of the `r3batch` access method includes two extended agent workstations, with unique identifiers `S4HANAR3BW` and `07756YBX76Z6AFX2`, then the names of the local options files are `S4HANAR3BW_r3batch.opts` and `07756YBX76Z6AFX2_r3batch.opts`.

### ***accessmethod***

Is the name of the access method.

If you do not create a local options file, the global options file is used. Every extended agent workstation, except for z/OS®, must have a local options file with its own configuration options.

The options files must be located in the `TWA_DATA_DIR/methods` directory. They are read when the supported agent is started. Options are specific to each access method. For details about how to configure each access method, see the following sections:

#### **PeopleSoft**

[Configuring the PeopleSoft access method on page 67.](#)

#### **SAP**

[Configuring the SAP access method on page 142.](#)

#### **z/OS**

[Configuring the z/OS access method on page 94.](#)

## Option value inheritance

*This property is currently available for r3batch only.* Local options files can inherit existing values from the same options in the global options file `r3batch.opts`. For an access method, the options are listed twice; once as global options and once as local options. If the local options file does not contain a value for the option, then the value for that option in the global options file is used. Otherwise the option value in the local options file is always used.

For example, you might want to define the same value for the **Ljuser** option and a different value for the **retrieve\_joblog** option. To do this, you define the **Ljuser** option value in the `r3batch.opts` file. Then you define a different value for the **retrieve\_joblog** option in each local options file. This results in the following actions when launching the SAP job:

- The value for the **Ljuser** option is extracted from the `r3batch.opts` file.
- The value for the **retrieve\_joblog** option is taken from each local options file.

## Editing the options files from the Dynamic Workload Console

You can modify a local or global options file, or create a local options file, by using either a text editor or the Option Editor described in [Using the Option Editor on page 51](#). On dynamic agents, for both SAP and PeopleSoft (access method job type) jobs, the Dynamic Workload Console provides an Options Editor integrated into the graphical user interface panel, where you can edit existing options files or create a new options file.

For SAP jobs, the Options Editor is available on the **General** tab.

Properties - SAP Job on Dynamic Workstations - NC005091\_1#mysapjob

General Affinity Recovery Options Credentials **Task** More Options Environment

\* Name:  \* Workstation:

Options file:

Description:

Select to edit or create a new options file. An Options Editor panel displays all the related options for the r3batch access method:

Options Editor

Agents:

\*Option file name:

Connection Scheduler options Throttling and intervals SAP options Local options

\*R/3 client:  \*R/3 application server:

\*R/3 instance:  \*R/3 password:

\*R/3 system:  \*R/3 RFC user:

r3auditlevel:  r3gateway:

r3group:  r3gwservice:

use\_fips:  utf8cmdline:

r3snclib:  r3sncmode:

r3snclib:  r3sncmyname:

r3sncpartnername:  r3sncqop:

For PeopleSoft jobs, the Options Editor is available on the **XA Task** tab of the Access Method job type.

## Using the Option Editor

Using the Option Editor.

## About this task

How you use the Option Editor to perform the following tasks:

- Modify local or global options file, see [Modifying local or global options files on page 54](#).
- Create a local options file, see [Creating local options files on page 54](#).

To start the Option Editor, go to the following directory of your IBM Workload Scheduler installation and, depending on your operating system, run the following command:

```
TWA_DATA_DIR/methods/opted/opted.bat
```



**Note:** To use the Option Editor on a UNIX workstation, you must have a graphical environment.

```
TWA_home\methods\opted\opted.sh
```

The Option Editor automatically loads all the existing global and local options files grouped by access method.

The Option Editor window has three main areas, as shown in [Figure 1: The Option Editor on page 53](#). To choose which areas you want to see, select **View > Show**. The areas are:

### File Options Tree

Shows a list of all the existing options files, grouped by method.

### Option Descriptor

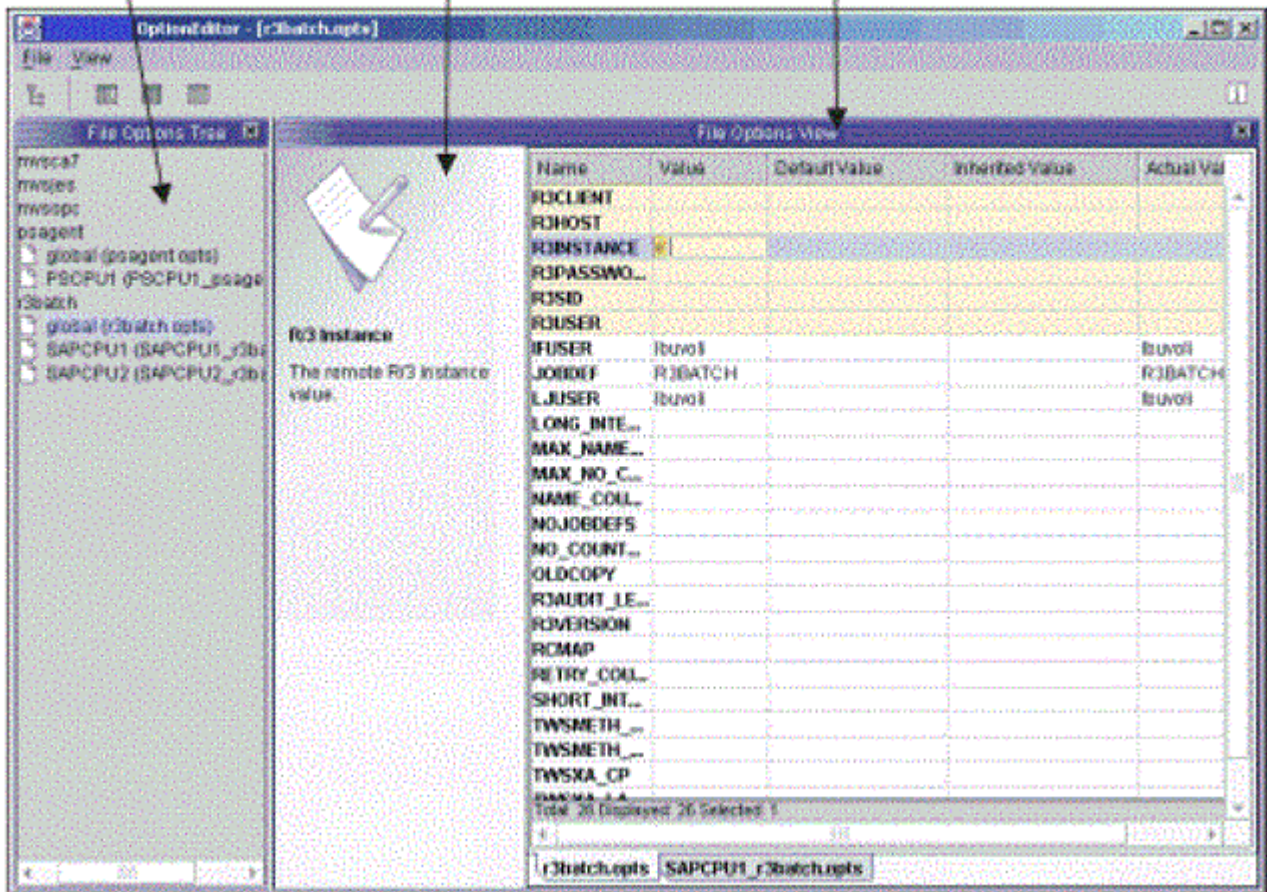
Gives a description of the current selection.

### File Options View

Displays the options of a selected file in any of the three available views.

Figure 1. The Option Editor

## Options Files Tree    Option Descriptor    File Options View



The Option Editor provides three possible views of an options file. To change the view in which the options file is displayed select **View > Display As**. The views are:

**Simple**

Displays the options as a sequence of tabs that you can select to edit one option at a time. To view or edit an option, select the tab with the option name to display the field for the value. This is the easiest way to edit options, because you only see the actual value that is used in the file. Inherited or default values are not displayed.

**Table**

Provides a tabular view of all the options for a selected file. This is the default view. For each option the following columns are displayed:

**Name**

The name of the option.

### **Value**

The value specified in the file.

### **Default Value**

The value used by the method if not specified in the options file or inherited.

### **Inherited Value**

The value obtained from the global options file if inheritance is supported by the access method.

For a detailed explanation, see [Option value inheritance on page 50](#).

### **Actual Value**

The value used at run time. The values are used in the order: value, if available; inherited value, if supported; default value.

### **Text**

Displays an options file in the typical format, showing only the options that have a value. This view is generally used for preview purposes, because files are shown in read-only form. Password fields are shown encrypted.

Mandatory options are identified by a yellow background and are marked with an asterisk (\*). Options that are not correctly entered are shown with a red background. The Option Editor performs only syntactic checks.

Restrict access to the Option Editor. If you have multiple installations of a supported agent, you can increase security by maintaining only one copy of the Option Editor, for example, on the master workstation.

## Modifying local or global options files

### **About this task**

To modify local or global options files, using the Option Editor, perform the following steps:

1. From the **File Options Tree** area, select the options file that you want to modify. The options are displayed in the **File Options View** area.
2. Select the option that you want to modify and modify its value.
3. Save and close the options file.

## Creating local options files

### **About this task**

You create local options files when you define a new supported agent workstation. For PeopleSoft and SAP access method, you can create a local options file right from the Workload Designer in the Dynamic Workload Console when defining the job definition. Alternatively, for these access methods and the z/OS access method, you can create a local options file using the Option Editor.

To create a local options file, using the Option Editor, perform the following steps:

1. Click **File > New** in the menu bar. The New Option File window is displayed.
2. In the **Insert XA CPU Name** field:

#### **Extended agents**

Enter the unique identifier for the extended agent workstation, *Unique\_ID*, for which you want to create an options file. See [UNIQUE\\_ID on page 49](#) for more details about identifying the unique identifier for a workstation.

#### **Dynamic agents and IBM Z Workload Scheduler agents**

##### ***optionsfile***

The name of the options file. This value can be different from the dynamic agent and IBM Z Workload Scheduler agent workstation name.

3. Select an access method from the **Insert Method Name** drop-down menu.

#### **Extended agents**

##### ***accessmethod***

The access method you selected.

#### **Dynamic agents and IBM Z Workload Scheduler agents**

##### ***accessmethod***

The access method you selected.

4. Enter values for the options you want to define.
5. Save and close the options file.

## Defining supported agent workstations

A workstation definition is required for each entity of an access method through which IBM Workload Scheduler schedules and launches jobs. For further details about supported agents, see [Supported agent workstations on page 16](#).

## Creating a workstation using the Dynamic Workload Console

### **About this task**

How to create a workstation definition for supported agents using the Dynamic Workload Console.

### **Dynamic agents and IBM Z Workload Scheduler Agents**

1. From the Dynamic Workload Console portfolio, click **Administration > Workload Environment Design > Create Workstations**.
2. Select an engine, distributed or z/OS®, from the list and click **Create Workstation**.
3. In the Workstations properties panel, specify the attributes for the extended agent workstation you are creating. For all the details about available fields and options, see the online help by clicking the "?" in the top-right corner. In the workstation definition, specify the access method and other properties, as shown in [Table 8: How to complete the extended agents definition on page 56](#). For further information about the workstation definition properties, see *IBM Workload Scheduler User's Guide and Reference*.
4. To assign the workstation to an existing domain or to create a new domain, click **Assign to Domain**.
5. Click **Save**.

The following table shows how to complete some specific fields of the workstation properties panel for **extended agents**.

**Table 8. How to complete the extended agents definition**

| Field     | Description by Access Method   |  |             |
|-----------|--|--|-------------|
|           | PeopleSoft   | z/OS®  | SAP         |
| Name      | <p>The name for the extended agent workstation. For all access methods (except for z/OS®, which has a limit of 8 characters), the name must start with a letter and can contain alphanumeric characters, dashes, and underscores. The maximum length is 16 characters. Workstation names must be unique and cannot be the same as workstation class and domain names. Double-byte character set (DBCS), single-byte character set (SBCS), and bidirectional text are not supported. If a workstation name contains these characters and, as a result, the options file name contains the same name, the workstation cannot be validated by the SAP system.</p> <p>For all the access methods, the name of the options file associated with the extended agent workstation must contain the unique identifier of the extended agent workstation, <i>XA_Unique_ID_&lt;accessmethod&gt;.opts</i>. That is, if the unique identifier for the extended agent workstation named <i>/SAPBUS/S4HANAR3BW</i> is <i>07756YBX76Z6AFX2</i>, then the options file name must be <i>07756YBX76Z6AFX2_r3batch.opts</i>. For information about retrieving the unique identifier for an extended agent workstation, see <a href="#">UNIQUE_ID on page 49</a>.</p> |  |             |
| Node Name | <b>null</b>  | The node name or IP address of the z/OS® system. Fully | <b>null</b> |



**Table 8. How to complete the extended agents definition**

(continued)

| Field         | Description by Access Method |   |   |
|---------------|------------------------------|---|---|
|               | PeopleSoft                   | z/OS®   | SAP   |
| TCP Port      | Any number other than 0.     | qualified domain names are accepted.<br>The TCP/IP address (port number) of the z/OS® gateway on the z/OS® system. Enter the same value as the SYSTSIN variable PORT.   | Any number other than 0.  |
| Access Method | <b>psagent</b>               | Depending on your job scheduling interface, one of the following:<br><br><b>mvsjes</b><br><br>To launch and monitor z/OS® jobs using JES2 or JES3.<br><br><b>mvsopc</b><br><br>To launch and monitor z/OS® jobs using IBM Z Workload Scheduler. | <b>r3batch</b><br><br> <b>Note:</b> In UNIX™ the name is case sensitive and must be lowercase. |
|               |                              |  <b>Note:</b> In UNIX™ operating systems, the name is case sensitive and must be lowercase.  |   |

### Creating a workstation using the command line

You can define supported agents workstations also using the **composer** command line of IBM Workload Scheduler.

## Dynamic agents

The following example shows a definition for a dynamic agent workstation named *LINUX248* that uses the secure protocol *https* to connect to the Broker server.

```
CPUNAME LINUX248
  DESCRIPTION "This workstation was automatically created."
  OS UNIX
  NODE linux248.romelab.it.abc.com SECUREADDR 31114
  TIMEZONE Europe/Rome
  FOR MAESTRO HOST NC118003_DWB
    AGENTID "FD640FCA740311E18C4EE96D727FA991"
    TYPE AGENT
    PROTOCOL HTTPS
  END
```

## Extended agents

The following example shows a definition for a z/OS extended agent workstation named *MVSCPU* that uses the `mvsjes` access method.

```
cpuname MVSCPU description "zOS extended agent"
  os other
  node mvsesa36.rome.abc.com
  tcpaddr 5000
  domain masterdm
  for maestro
    type x-agent
    host ROCIOUS
    access mvsjes
  end
```

For details about defining workstations with **composer**, see the *IBM Workload Scheduler User's Guide and Reference*.

## Defining workstations for end-to-end scheduling

### About this task

How to create a workstation definition for end-to-end environment.

Scheduling in an end-to-end environment means that in IBM Z Workload Scheduler you are scheduling and monitoring jobs that are physically running on IBM Workload Scheduler workstations. For the agents supported in the z/OS environment, see [Supported agent workstations on page 16](#).

### Extended agents

Extended agent workstations must be defined as fault-tolerant workstations in IBM Z Workload Scheduler.

A fault-tolerant workstation is the IBM Z Workload Scheduler definition of an existing IBM Workload Scheduler agent in the distributed network. The IBM Workload Scheduler agent is where the job associated with the fault-tolerant workstation actually runs in the distributed network.

To define the extended agent workstation in IBM Z Workload Scheduler, you must:

1. Define the workstation in the CPUREC initialization statement. For an example, see [Creating the CPUREC statement for extended agents on page 59](#).
2. Add the same workstation definition to the database using ISPF or the Dynamic Workload Console. For a description of how to define the workstation using the Dynamic Workload Console, see *Dynamic Workload Console User's Guide*. For an example, see [Defining the workstation with ISPF on page 60](#).

### IBM Z Workload Scheduler agents

To define the agent workstation with z-centric capability in IBM Z Workload Scheduler, add the workstation definition to the database using ISPF or the Dynamic Workload Console. For further information, see *Scheduling End-to-end with z-centric Capabilities*.

## Creating the CPUREC statement for extended agents

*This section is valid only for Extended agents.* Create the CPUREC statement for the workstation in the TOPOLOGY initialization statement. The TOPOLOGY initialization statement is used to define parameters related to the topology of the connected IBM Workload Scheduler network. Such a network topology statement is made up of one or more (one for each domain) DOMREC statements that describe the topology of the distributed network, and by several CPUREC statements, one for each fault-tolerant workstation.

The following example shows a CPUREC statement for an SAP extended agent workstation named R3XA. The extended agent is hosted by an IBM Workload Scheduler agent named TWSA, which is also the domain manager of DOMAIN1.

```
*****TPLGINFO MEMBER *****

/*****/
/* DOMREC: Domain definition */
/*****/
DOMREC  DOMAIN(DOMAIN1)
        DOMMNGR(TWSA)
        DOMPARENT(MASTERDM)

/*****/
/* CPUREC: Extended agent workstation definition */
/*****/
CPUREC  CPUNAME(R3XA)
        CPUOS(OTHER)
        CPUNODE(NODE1)
        CPUDOMAIN(DOMAIN1)
        CPUHOST(TWSA)
        CPUTYPE(XAGENT)
        CPUACCESS(r3batch)
        CPUUSER(TWSuser)
        CPUTZ('Europe/Rome')

/*****/
/* CPUREC: Domain manager workstation definition */
/*****/
CPUREC  CPUNAME(TWSA)
        CPUNODE(NODE1)
        CPUAUTOLINK(ON)
        CPUDOMAIN(DOMAIN1)
        CPUTYPE(FTA)
```

```
CPUUSER(TWSuser)
CPUTZ('Europe/Rome')
```

The following keywords define `R3XA` as an extended agent:

#### **CPUACCESS**

The extended agent access method. For SAP, it is `r3batch`.

#### **CPUHOST**

The name of the IBM Workload Scheduler workstation hosting the extended agent. It cannot be another standard agent or extended agent.

#### **CPUTYPE**

The workstation type. For an extended agent, it must be `XAGENT`.



**Note:** The `CPUREC` statement does not exist for an IBM Workload Scheduler for z/OS agent workstation.

For further information about `CPUREC` for extended agents, see *Customization and Tuning*.

## Defining the workstation with ISPF

### **About this task**

This section shows the ISPF definition for extended agents and agents with z-centric capability.

#### **Extended agents**

In ISPF, define the workstation as `computer automatic` and then set the *FT Work station* field to **Y**. The `CPUREC` statement with the three keywords described in [Creating the CPUREC statement for extended agents on page 59](#) provides the extended agent specification.



**Note:** Make sure you write the `CPUREC` statement before making the ISPF or Dynamic Workload Console definition, because they have no effect without the `CPUREC` statement.

Figure 2. Defining an Extended Agent workstation

```

----- CREATING GENERAL INFORMATION ABOUT A WORK STATION -----
Command ==>

Enter the command R for resources  A for availability or M for access method
above, or enter data below:

WORK STATION NAME  ==> R3XA
DESCRIPTION        ==> Extended agent for R/3 access method-----
WORK STATION TYPE  ==> C          G General, C Computer, P Printer
REPORTING ATTR     ==> A          A Automatic, S Manual start and completion
                                   C Completion only, N Non reporting
FT Work station    ==> Y          FT Work station, Y or N
PRINTOUT ROUTING  ==> SYSPRINT   The ddname of daily plan printout data set
SERVER USAGE      ==> N          Parallel server usage C , P , B or N

Options:
SPLITTABLE        ==> N          Interruption of operation allowed, Y or N
JOB SETUP         ==> N          Editing of JCL allowed, Y or N
STARTED TASK, STC ==> N          Started task support, Y or N
WTO               ==> N          Automatic WTO, Y or N
DESTINATION       ==> -----   Name of destination
Defaults:
TRANSPORT TIME    ==> 00.00      Time from previous work station  HH.MM
DURATION          ==> -----   Duration for a normal operation  HH.MM.SS

```

### IBM Z Workload Scheduler agents

For detailed information and examples about the ISPF definition of IBM Z Workload Scheduler agents with z-centric capabilities, see *Scheduling End-to-end with z-centric capabilities*.

## Defining jobs for supported agents

To run and monitor a PeopleSoft, SAP, or z/OS job with IBM Workload Scheduler, the supported agents, or access method require an IBM Workload Scheduler job definition, where you specify the external job you want to schedule, the workstation (also defined in IBM Workload Scheduler) on which it is to run, and any recovery actions. To define the job, use either of the following methods:

- Dynamic Workload Console.
- IBM Workload Scheduler **composer** command line.

If you are scheduling in an end-to-end environment, to define the job, use either of the following methods:

- Dynamic Workload Console.
- IBM Z Workload Scheduler ISPF dialogs. You must also create a member in the `SCRIPTLIB` with a `JOBREC` statement for the job.

Jobs defined for supported agents are added to job streams and scheduled in the same way as any other job in IBM Workload Scheduler and IBM Z Workload Scheduler.

## Defining jobs with the Dynamic Workload Console

### About this task

How to create a job definition for supported agents using the Dynamic Workload Console.

Steps for defining a job for supported agents.

To define jobs, follow these steps:

1. From the Dynamic Workload Console portfolio, click **Administration > Workload Design > Manage Workload Definitions**.
2. Specify an engine name, either distributed or z/OS. The Workload Designer window opens. Job types and characteristics vary depending on whether you select a distributed or a z/OS engine.
3. In the Working List pane, select **New > Job Definition**.
4. Select the category and type of job you want to create.
  - For SAP jobs, **ERP > SAP Job on XA Workstations** or **SAP Job on Dynamic Workstations**. See [Creating SAP Standard R/3 jobs from the Dynamic Workload Console on page 167](#).
  - For z/OS and PeopleSoft, **ERP > Access Method**.
5. In the properties panel, specify the attributes for the job definition you are creating. For all the details about available fields and options, see the online help by clicking the "?" in the top-right corner.
6. Click **Save** to save the job definition in the database.



**Note:** The access method for SAP provides supplementary features if you use the alternative steps described in [Create an SAP job and associate it to an IBM Workload Scheduler job on page 168](#) or [Creating an SAP job from the Dynamic Workload Console on page 172](#). You can create native SAP Standard jobs on a remote SAP system directly from the Dynamic Workload Console.

## Defining jobs using the command line

You can also define jobs using the **composer** command line of IBM Workload Scheduler.

### Dynamic agents

The following example describes an IBM Workload Scheduler job named `DYN_JOB_R3_0001` defined in the folder name `SAPJOBS`, that runs on a dynamic agent workstation named `NC112015_1`. The IBM Workload Scheduler launches a job in an SAP environment named `JOB_APPS_93`.

```
NC112015_1#/SAPJOBS/DYN_JOB_R3_0001
TASK
<?xml version="1.0" encoding="UTF-8"?>
<jSDL:jobDefinition
  xmlns:jSDL="http://www.abc.com/xmlns/prod/scheduling/1.0/jSDL"
  xmlns:jSDLxa="http://www.abc.com/xmlns/prod/scheduling/1.0/jSDLxa"
  name="r3">
  <jSDL:application name="r3" plugin="xajob">
  <jSDLxa:xajob accessMethod="r3batch" target="NW73LIN_r3batch">
    <jSDLxa:taskString>/ -job JOB_APPS_93 -i 14514200 -c c
    -flag ENABLE_APPL_RC </jSDLxa:taskString>
```

```

    </jsdlxa:xajob>
  </jsdl:application>
</jsdl:jobDefinition>
RECOVERY STOP

```

### Extended agents

The following example describes an IBM Workload Scheduler job named `psjob2` that runs on a PeopleSoft extended agent workstation with unique identifier named `XAPS002`. IBM Workload Scheduler logs on to UNIX operating system as `psjobs` and launches a job under PeopleSoft. The PeopleSoft process is named `XRFWIN`. If recovery is needed, IBM Workload Scheduler runs job `recov2` and then continues processing.

```

XAPS002#/myspsjobs/psjob2
  streamlogon psjobs
  scriptname
    -process XRFWIN -type 'SQR Report' -runcontrol 1 -runlocationdescr PSNT
  description "peoplesoft job #2"
  recovery continue after recov2

```

The arguments of `scriptname` differ by application. For details, see:

- [Task string parameters for PeopleSoft jobs on page 75.](#)
- [Task string to define SAP jobs on page 178.](#)
- [Task definition syntax for z/OS jobs scheduled with IBM Workload Scheduler on page 96.](#)

For more information about using the **composer** command line to define jobs, see *User's Guide and Reference*.

## Defining jobs for end-to-end scheduling

### Extended agents

Extended agent jobs scheduled to run in an end-to-end environment cannot be defined using the Dynamic Workload Console or the IBM Workload Scheduler command line, but must be added to the `SCRIPTLIB` of IBM Z Workload Scheduler.

In the `OPERATIONS` ISPF panel of IBM Z Workload Scheduler, extended agent jobs are defined like any other job, but with the specific attribute for a job defined on an extended agent workstation. The following example shows the definition of a job named `SAPJOB`. This is the IBM Z Workload Scheduler job that drives the running of on SAP R/3 job (named `BAPRINT46B` as shown in the next example). It shows as an extended agent job because the associated workstation is an extended agent workstation named `R3XA`.

Figure 3. Defining an Extended Agent job for end-to-end scheduling

```

----- OPERATIONS -----Row 1 to 1 of 1
Command ==>                Scroll ==> PAGE

Enter/Change data in the rows, and/or enter any of the following
row commands:
I(nn) - Insert, R(nn),RR(nn) - Repeat, D(nn),DD - Delete
S - Select operation details, J - Edit JCL
Enter the TEXT command above to include operation text in this list, or,
enter the GRAPH command to view the list graphically.

Application           : APLL1           FTW appl

Row  Oper      Duration Job name Internal predecessors      Morepreeds
cmd  ws   no.   HH.MM.SS                -IntExt-
'''  R3XA 001   00.00.01  SAPJOB_          _____          0  0
***** Bottom of data *****

```

For each job, create a member in the `SCRIPTLIB` of IBM Z Workload Scheduler with details about the job in a `JOBREC` statement. A `SAPJOB` member was created for the job of the previous example. It contains a `JOBREC` statement like this:

```

JOBREC
  JOBCMD('/-job BAPRINT46B -user MAESTRO -i 14160001 -c C')
  JOBUSR(twsila)

```

The string in `JOBCMD` is read and interpreted by the access method before running the job. The job of this example, `BAPRINT46B`, was previously defined on SAP R/3 and assigned with an ID of 14160001, that was manually written in `JOBCMD`.

The following example is for a PeopleSoft job. The entire string that follows the `JOBCMD` keyword must be enclosed within quotation marks ("), because for PeopleSoft jobs single quotes are already used in the string.

```

JOBREC
  JOBCMD("/ -process XRFWIN -type 'SQR Report' -runcontrol IWS")
  JOBUSR(PsBuild)

```

### IBM Z Workload Scheduler agents

For information about the jobs definition for agent with z-centric capabilities, see *Scheduling End-to-end with z-centric capabilities*.

The arguments of `JOBCMD` differ by application. For details, see:

- [Task string parameters for PeopleSoft jobs on page 75](#).
- [Task string to define SAP jobs on page 178](#) or [Defining SAP jobs dynamically on page 197](#).
- [Task definition syntax for z/OS jobs scheduled with IBM Workload Scheduler on page 96](#).

## Submitting jobs

### About this task

To submit jobs on the supported agent workstation, perform the following steps:

1. Verify that the application system to which the job belongs and the related database is up and running.
2. Launch the job. For details, see:



**Dynamic agents**

- *IBM Workload Scheduler User's Guide and Reference* for **conman** command line.
- *Dynamic Workload Console User's Guide* for Dynamic Workload Console.

**Extended agents**

- *IBM Workload Scheduler User's Guide and Reference* for **conman** command line.
- *Dynamic Workload Console User's Guide* for Dynamic Workload Console.

**IBM Z Workload Scheduler agents**

- *IBM Z Workload Scheduler: Scheduling End-to-end with z-centric Capabilities* for **ISPF** panel.
- *Dynamic Workload Console User's Guide* for Dynamic Workload Console.

# Chapter 9. Access method for PeopleSoft

What you need and what you can do with Access method for PeopleSoft.

Using Access method for PeopleSoft you can run and monitor PeopleSoft jobs from the IBM Workload Scheduler environment. These jobs can be run as part of a schedule or submitted for ad-hoc job processing. PeopleSoft extended agent or dynamic agent jobs can have all of the same dependencies and recovery options as other IBM Workload Scheduler jobs. PeopleSoft jobs must be defined in IBM Workload Scheduler to be run and managed in the IBM Workload Scheduler environment.

For information about the supported versions of the plug-ins and access methods, run the [Data Integration](#) report and select the **Supported Software** tab.

## Features

Look at the tasks you can perform by using Access method for PeopleSoft.

Using Access method for PeopleSoft, you can perform the following tasks:

- Use IBM Workload Scheduler standard job dependencies on PeopleSoft jobs.
- Schedule PeopleSoft jobs to run on specified days, times, and in a prescribed order.
- Define inter-dependencies between PeopleSoft jobs and IBM Workload Scheduler jobs that run on different applications such as SAP and Oracle E-Business Suite.
- Define inter-dependencies between PeopleSoft jobs and jobs that run on different operating systems.

## Roles and responsibilities

Here you can see the roles and responsibilities of all the actors involved in the process model, and the tasks they perform.

In a typical enterprise, different users contribute to the implementation and operation of the product. [Table 9: Roles and responsibilities in Access method for PeopleSoft on page 66](#) describes the roles and responsibilities of all those involved in the process model, showing the tasks they perform.

**Table 9. Roles and responsibilities in Access method for PeopleSoft**

| User role                           | User task  |
|-------------------------------------|--|
| IBM Workload Scheduler configurator | <a href="#">Defining the configuration options on page 68</a>  |
| IBM Workload Scheduler developer    | <ul style="list-style-type: none"><li>• <a href="#">Defining PeopleSoft jobs in IBM Workload Scheduler on page 75</a></li><li>• <a href="#">Configuring the job status mapping policy on page 78</a></li></ul> |

**Table 9. Roles and responsibilities in Access method for PeopleSoft (continued)**

| User role                | User task   |
|--------------------------|---|
| PeopleSoft administrator | <ul style="list-style-type: none"> <li>• <a href="#">Creating a batch processing ID in PeopleSoft on page 71</a></li> <li>• <a href="#">Configuring the ITWS_PSYA PeopleSoft project on page 72</a></li> <li>• <a href="#">Uploading the PeopleSoft project on page 72</a></li> </ul> |

## Scheduling process for the PeopleSoft supported agents

IBM Workload Scheduler can launch and monitor jobs in the PeopleSoft process scheduler using a PeopleSoft extended agent or dynamic agent workstation. The PeopleSoft supported agent (extended agent or dynamic agent) is defined in a standard IBM Workload Scheduler workstation definition. This definition is a logical workstation name and specifies the access method as `psagent`. The access method is used to communicate job requests to the PeopleSoft process scheduler.

To launch a PeopleSoft job, IBM Workload Scheduler runs the `psagent` method, passing it information about the job. An options file provides the method with the path, the executable, and other information about the PeopleSoft process scheduler and application server used to launch the job. The supported agent can then access the PeopleSoft process request table and make an entry in the table to launch the job. Job progress and status information is written to the job's standard list file.

For extended agents, there is no need to install Database connectivity on fault-tolerant agents hosting PeopleSoft extended agents because the method currently uses the PeopleSoft 3-tier architecture. You must configure at least one PeopleSoft Application Server for the supported agent to work. The application server must be active to successfully submit jobs to the PeopleSoft process scheduler.

## PeopleSoft job tracking in IBM Workload Scheduler

A PeopleSoft job is a collection of processes that run together as a single unit. IBM Workload Scheduler jobs can be defined in one of the following ways:

- As PeopleSoft jobs, that is, as a collection of PeopleSoft processes. In this case, the status of the PeopleSoft job is tracked, not the status of the individual processes within the job.
- As PeopleSoft processes. In this case, the status of the individual process is tracked and IBM Workload Scheduler schedules can be defined to create complex inter-dependencies and recovery options between PeopleSoft processes.

## Security

Security for the PeopleSoft jobs is handled by standard IBM Workload Scheduler security.

## Configuring the PeopleSoft access method

This section provides detailed reference information about the PeopleSoft options and how to define them in the options file.

## Defining the configuration options

The IBM Workload Scheduler installation process creates a default global options file for the `psagent` access method, named `psagent.opts`. You can also create the following local files in the path:

### On UNIX operating systems

```
TWA_DATA_DIR/methods
```

### On Windows operating systems

```
TWA_home\methods
```

### Extended agent

`XA_Unique_ID_psagent.opts` where `XA_Unique_ID` is the unique identifier for the extended agent workstation. For more details about how to identify the unique ID, see [UNIQUE\\_ID on page 49](#).

### Dynamic agent

`DYNAMIC_AGENT_FILE_psagent.opts` where `DYNAMIC_AGENT_FILE` is any text string. This string does not necessarily correspond to the name of the dynamic agent workstation since the dynamic agent can have more than one `.opts` file associated. For more information, see [Setting options for the access methods on page 46](#).

To edit both options file, you can use either the Option Editor available with this product, or any other text editor. On dynamic workstations, you can edit the options files from the job definition panels in the Dynamic Workload Console. For details about how to create and edit the options files with the Option Editor, see [Setting options for the access methods on page 46](#). For examples of options files for this access method, see [PeopleSoft options file example on page 70](#).

[Table 10: Psagent access method options on page 68](#) describes the options for the `psagent` access method. Option names are case insensitive. Before you use a manually-created options file, check that all the option names are written correctly, otherwise they will be ignored.

**Table 10. Psagent access method options**

|  |  |
|--|--|
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

Table 10. Psagent access method options (continued)

| Option            | Description  |
|-------------------|--|
|                   | For details about how to encrypt the password, see <a href="#">Encrypting PeopleSoft operator passwords on page 71</a> .   |
| PSFT_OPERATOR_ID  | (Mandatory) Specifies the PeopleSoft operator ID used for the connection to the PeopleSoft application server.   |
| PSFT_OPERATOR_PWD | (Mandatory) Specifies the encrypted password (case-sensitive) of the PeopleSoft operator ID used for the connection to the PeopleSoft application server.<br><br>For details about how to encrypt the password, see <a href="#">Encrypting PeopleSoft operator passwords on page 71</a> .  |
| PSJOAPATH         | (Optional) Specifies the full path name of the <code>psjoa.jar</code> file, containing both the path and the <code>psjoa.jar</code> filename.<br><br>If this option is not set, the following default path name is used:<br><br><div style="text-align: center; margin: 10px 0;"> <pre>TWA_DATA_DIR/methods/psjoa.jar</pre> </div> <div style="text-align: center; margin: 10px 0;"> <pre>TWA_home\methods\psjoa.jar</pre> </div><br>Ensure that you identify the version of the <code>psjoa.jar</code> file that corresponds to the version of PeopleSoft that you are using. |
| RUNLOCATION       | (Optional) Specifies the default PeopleTools process server that processes the requests.   |
| SERVER_NAME_LIST  | (Mandatory) Specifies the list of application servers that the psagent tries to connect to. It is a comma-separated list of addresses in the format:<br><br><div style="text-align: center; margin: 10px 0;"> <pre>server:port [,server:port] ...</pre> </div><br>where:<br><br><p><b>server</b></p> <p style="padding-left: 40px;">Specifies the host name or TCP/IP address of the server</p> <p><b>port</b></p> <p style="padding-left: 40px;">Specifies the port number the server is listening on.</p>  |
| TWS_MAX_WAIT_TIME | (Optional) Specifies the maximum time that the supported agent waits (timeout) after a failed operation on the PeopleSoft application server before retrying the operation. The default is 10 seconds.   |

**Table 10. Psagent access method options (continued)**

| Option            | Description  |
|-------------------|--|
| TWS_MIN_WAIT_TIME | (Optional) Specifies the minimum time that the supported agent waits (timeout) after a failed operation on the PeopleSoft application server before retrying the operation. The default is 5 seconds.  |
| TWS_RETRY         | (Optional) The maximum number of times that the supported agent attempts to re-run a failed operation on the PeopleSoft application server. The default is 5.  |
| TWSXA_INLINE_CI   | <p>(Optional) Specifies the name of the component interface that the <code>psagent</code> invokes to submit jobs to PeopleSoft.</p> <p>The default is <code>ITWS_PROCESSREQUEST</code>. If you use this default, you must perform the customization steps described in <a href="#">Configuring the ITWS_PSOXA PeopleSoft project on page 72</a>.</p> <p>If you do not plan to schedule jobs containing in-line variables, and you do not want to perform the additional customization steps, you must replace the default value with <code>PROCESSREQUEST</code>. This is the component interface invoked by previous versions of the access method; it does not allow the use of in-line variables.</p> |
| TWSA_SCHED_METH   | <p>(Optional) Specifies the name of the PeopleSoft method invoked by the component interface specified in <code>TWSXA_INLINE_CI</code>. Both <code>ITWS_PROCESSREQUEST</code> and <code>PROCESSREQUEST</code> use the default method <code>Schedule</code>.</p> <p>If you are using either of these component interfaces, leave the default. If you are using a different component interface, specify the name of the method called by your component interface, respecting the case of the PeopleSoft object name.</p>   |

## PeopleSoft options file example

Below is a sample options file. It can help you determine your specific site requirements although your options file might be different.

Remember to save the file in the following directory:

```
TWA_DATA_DIR/methods
```

```
TWA_home\methods
```

### Example

```
LJuser=TwsUsr
CheckInterval=120
PSFT_OPERATOR_ID=PSHC
```

```
PSFT_OPERATOR_PWD=*****
SERVER_NAME_LIST=9.87.120.36:9000
```

If you create the options file manually, you must encrypt the PeopleSoft operator password, as described in [Encrypting PeopleSoft operator passwords on page 71](#).

## Encrypting PeopleSoft operator passwords

When you add or change the PeopleSoft operator password using the Option Editor or the Dynamic Workload Console, the password is automatically encrypted and inserted into the file, and appears as asterisks on the screen.

When you add or change the PeopleSoft user password using a text editor, you must run the **pwdcrypt** program to encrypt the password before writing it in the file. To run the encryption program, enter the following command:

```
pwdcrypt password
```

The program returns an encrypted version that you can then copy and paste into the options file.

## Connecting to more than one PeopleSoft application server

It might be necessary for the `psagent` method to connect to more than one PeopleSoft application server. For example, a single installation of PeopleSoft might have a TEST, DEMO, and PRODUCTION environment, each with a separate application server. This requires that the `psagent` method uses a separate connect string for each application server.

To support this, you can set up multiple PeopleSoft extended agent workstations that connect to the same method but use different options files. When a workstation starts the method, it first looks for the options file with extended agent workstation unique identifier prepended to `psagent.opts`. For example, a PeopleSoft extended agent with unique identifier `ps847system` would have the following options file:

```
PS847SYSTEM_psagent.opts
```

The **psagent** method searches first for an options file with the extended agent workstation unique identifier, and then for the default `psagent.opts` file. This allows the user to set up an extended agent for each PeopleSoft application server.

To connect to only one application server, use the default name for the options file, **psagent.opts**.



**Note:** In case you specify some connection properties in your local option files, make sure that the same properties are commented out in your global option file, with the exception of the global property **LJuser**. This action is needed to avoid that warning messages related to duplicate properties are displayed in the job log.

## Creating a batch processing ID in PeopleSoft

Create an operator ID in PeopleSoft dedicated to batch scheduling. This operator ID must be granted authority to use the Component Interface in the PeopleTools environment. All the jobs submitted by IBM Workload Scheduler should use this operator ID.

## Configuring the ITWS\_PSYA PeopleSoft project

### About this task

The configuration steps described in this section are necessary to enable IBM Workload Scheduler to schedule PeopleSoft jobs that have in-line variables in their definitions.

The `ITWS_PROCESSREQUEST` component interface works around some limitations of the PeopleSoft APIs when invoked from a batch environment. Because of these limitations, IBM Workload Scheduler cannot schedule jobs defined with in-line bind variables. With current PeopleSoft APIs, data that is stored in the PeopleSoft database and referred to by a `runcontrol ID` parameter that is used to retrieve a `runcontrol` data record, needs to be loaded into the `Component Buffer` before scheduling the API invocation. This cannot be done from a batch environment. Therefore, when invoking the PeopleSoft scheduling APIs from a batch interface, the data related to the `runcontrol ID` is not available for the submission of a job, even though it is available in the database. When unresolved data is present in the submitted job, the PeopleSoft system refuses submission and ends with an error.

The `ITWS_PROCESSREQUEST` component interface enables IBM Workload Scheduler to schedule PeopleSoft jobs that have in-line variables in their definitions. By invoking this component interface, the access method provides the ability to use data stored in the PeopleSoft database to resolve in-line variable values by taking data from the database and substituting it with variable definitions. It then allows job submission regardless of the use of in-line variable definitions in the jobs. The variable substitution mechanism does not support `work` records, so if the PeopleSoft process uses work records in its parameter list, you find a message similar to the following in the IBM Workload Scheduler joblog:

```
Error Position: 21
Return: 942 - ORA-00942: table or view does not exist
Statement:
select nvsdlist from PS_NVS_WRK WHERE BUSINESS_UNIT = :1 AND REPORT_ID = :2
Original Statement:
SELECT NVSDLIST FROM PS_NVS_WRK WHERE BUSINESS_UNIT = :1 AND REPORT_ID = :2.
```

To identify work records, use the following PeopleSoft naming conventions:

- A derived work record name ends with `'_WRK'`.
- A work record definition name for Structured Query Report reports starts with `R_`

When you use IBM Workload Scheduler to submit a process that has in-line bind variables, the name of the process type in the PeopleSoft GUI becomes `ITWS_process type`. For example, `SQR Process` becomes `ITWS_SQR Process`.

To schedule a job that contains in-line variables in its definition you must perform the following tasks:

- Leave the value of the `TWSXA_INLINE_CT` option set to `ITWS_PROCESSREQUEST`, that is the default value. See [Defining the configuration options on page 68](#) for a detailed explanation.
- Upload the PeopleSoft project as described in [Uploading the PeopleSoft project on page 72](#).

## Uploading the PeopleSoft project

### About this task



This section describes how to upload a new PeopleSoft project related to PeopleTools 8.44, or later, into the PeopleSoft database. The name of the PeopleSoft project is `ITWS`.

After installing the product, complete the following steps:

1. Mount the PT844 PeopleSoft project directory or copy it to the workstation from where you launch the Application Designer. IBM Workload Scheduler installs the PeopleSoft project directories, as shown in the following structure:

```
TWS_DIR/methods/
/---PeopleSoft
  /---PT844
    /---ITWS_P SXA
      ITWS_P SXA.ini
      ITWS_P SXA.XML
```

```
TWS_DIR\methods\
\---PeopleSoft
  \---PT844
    \---ITWS_P SXA
      ITWS_P SXA.ini
      ITWS_P SXA.XML
```

2. Start the Application Designer and from the sign-on window select to start the Application Designer in tier-two mode by entering the following information:
  - **Connection Type:** *database used*, for example, Oracle
  - **Database Name:** *database instance name*
  - **User ID:** *PeopleSoft operator name*; for example, PS
  - Password of user ID
3. Using the Application Designer, select **Tools -> Copy Project-> From file...**
4. Using the browser, edit the full path to specify the folder where the project that you want to load is located.

The project is contained in the `TWS_DIR/methods/PeopleSoft/PT844` subdirectories on UNIX® and in `TWA_home\methods\PeopleSoft\PT844`. on Windows™.

After you specify the project folder, a list of projects appears in the **Project Name** field of the Copy Project From File window.

5. Choose `ITWS_P SXA` and click **Open**. If you already configured `ITWS_P SXA` (perhaps after installing a fix pack), a confirmation window enquires if you want to replace the existing one. Click **Yes**.

The Copy window is displayed showing a list of definition types.

6. Click **Options** to select the new settings.
  - a. Click **Report Filter**
  - b. Click **Select All**
  - c. Click **OK**

- d. Click **Select All**
- e. Click **Copy**. A progress bar is displayed.

After loading the project, the PeopleSoft Database contains the following objects:

- ITWS process type definitions
- ITWS permissions list
- ITWS component interfaces

7. Create the `ITWS_ROLE` security role. You can use either the PeopleSoft Web GUI or the Application Designer. Follow the steps below:

From the menu of the PeopleSoft Web GUI:

- a. Select: **People tools -> Security -> Permission and Roles -> Roles**
- b. Select the **Add a new value** tab
- c. Type or select `ITWS_ROLE` in the **Role Name** field
- d. Select the **Permissions list** tab -> **ITWS -> Save**

From the Application Designer GUI:

- a. Using Maintain Security, edit the `ITWS_ROLE` window
- b. Select the **Permissions list** tab -> **ITWS -> Save**

8. Grant `ITWS_ROLE` authority to all users who want to schedule jobs from IBM Workload Scheduler. You can use either the PeopleSoft Web GUI or the Application Designer. Follow the steps below:

From the PeopleSoft Web GUI:

- a. Select: **People tools -> Security -> User Profiles**
- b. Type the user name of the user who wants to schedule jobs from IBM Workload Scheduler
- c. Select the **Roles** tab
- d. Add `ITWS_ROLE` and save

From the Application Designer GUI:

- a. Using Maintain Security, edit the user name
- b. Select the **Roles** tab
- c. Add `ITWS_ROLE` and save

9. Add the ITWS process type definitions to the required PeopleTools process scheduler. You can use either the PeopleSoft Web GUI or the Application Designer. Follow the steps below:

From the PeopleSoft Web GUI:

- a. Select **PeopleTools -> Process Scheduler -> Servers**
- b. Select your PeopleTools server
- c. Add the `ITWS_*` Type definitions and save

From the Application Designer GUI:

- a. Select **Process Scheduler Manager**
- b. Select your PeopleTools server
- c. Add the `ITWS_*` Type definitions and save



**Note:** From the SQL interactive command line, the same task can be performed by the following sample statement, customized for your database environment:

```
INSERT INTO PS_SERVERCLASS SELECT o.SERVERNAME,
o.OPSYS, 'ITWS_' || o.PRCSTYPE, o.PRCSPRIORITY,
o.MAXCONCURRENT FROM PS_SERVERCLASS
o WHERE ( SELECT count(*) FROM PS_SERVERCLASS i WHERE
i.SERVERNAME=o.SERVERNAME AND i.OPSYS=o.OPSYS AND
i.PRCSTYPE='ITWS_' || o.PRCSTYPE ) = 0
AND ( select count(*) from PS_PRCSTYPEDEFN
a where a.PRCSTYPE='ITWS_' || o.PRCSTYPE AND a.OPSYS=o.OPSYS ) > 0
```

10. Restart the process servers.

You do not need to change the existing IBM Workload Scheduler job definitions, except for the scheduling nVision process, where the `runcontrol ID` must be specified using the `BUSINESS_UNIT.REPORT_ID` convention.

The following is an example of a job definition for the scheduling nVision process:

```
-process 'NVSRUN' -type nVision-Report -runcontrol AUS01.VARIABLE
```

where `NVSRUN` is the process name and `AUS01.VARIABLE` is the `BUSINESS_UNIT.REPORT_ID`.

## Defining PeopleSoft jobs

This section provides job definition information for jobs using the extended agent for PeopleSoft.

### Defining PeopleSoft jobs in IBM Workload Scheduler

An IBM Workload Scheduler job definition is required for every PeopleSoft job you want to manage. An IBM Workload Scheduler job is associated to an already defined PeopleSoft job and its definition includes:

- The name of the IBM Workload Scheduler job that runs the PeopleSoft job
- The unique identifier of the extended agent or dynamic workstation or workstation class where the IBM Workload Scheduler job runs. See [UNIQUE\\_ID on page 49](#) for more information about the unique identifier.
- The name of the user launching the job
- Recovery options
- The Script file specifications

For more information, refer to [Defining jobs for supported agents on page 61](#).

### Task string parameters for PeopleSoft jobs

This section describes the task string parameters that control the operation of PeopleSoft jobs. You must specify them in the following places when you define their associated IBM Workload Scheduler jobs:

- In the **Task string** field of the Task page of the Properties - Job Definition panel, if you use the Dynamic Workload Console
- As arguments of the `scriptname` keyword in the job definition statement, if you use the IBM Workload Scheduler command line.
- As arguments of the `JOBCMD` keyword in the `JOBREC` statement in the `SCRIPTLIB` of IBM Z Workload Scheduler, if you are scheduling in an end-to-end environment. In this case the entire string following the `JOBCMD` keyword must be enclosed within quotation marks (").

The following is an example of a `JOBREC` statement:

```
JOBREC
  JOBCMD("/-process process_name -type 'process_type' -runcontrol runcontrol_ID")
  JOBUSR(TWS_user_name)
```

where:

***process\_name***

The process name for the PeopleSoft job.

***process\_type***

The process type for the PeopleSoft job. This entry must be enclosed within single quotes.

***runcontrol\_ID***

The runcontrol ID for the PeopleSoft job.

***TWS\_user\_name***


The IBM Z Workload Scheduler user who runs the `psagent` access method from the end-to-end scheduling environment.

Table 11: Task string parameters for PeopleSoft jobs on page 76 describes the parameters to define PeopleSoft jobs.


**Table 11. Task string parameters for PeopleSoft jobs**

| Parameter   | Description  |
|-------------|--|
| -process    | The process name for the PeopleSoft job.   |
| -type       | The process type for the PeopleSoft job. This entry must be enclosed within single quotes.   |
| -runcontrol | The runcontrol ID for the PeopleSoft job.  |
| -outputdest | The destination of the PeopleSoft job output.  |
| -outputtype | The output type of the PeopleSoft job. Possible values are: <ul style="list-style-type: none"> <li>• Any</li> <li>• Email</li> <li>• File</li> <li>• None</li> </ul> |

Table 11. Task string parameters for PeopleSoft jobs (continued)

| Parameter     | Description   |
|---------------|---|
| -outputformat | <ul style="list-style-type: none"> <li>• Printer</li> <li>• Web</li> <li>• Window</li> </ul> <p>If you do not specify any value, IBM Workload Scheduler uses the value associated to the PeopleSoft job you are submitting.</p> <p> <b>Note:</b> Depending on the PeopleSoft configuration, some combinations of the value of this option with the value of the <b>outputformat</b> option are not supported. In this case the PeopleSoft default value is used.</p> <p>The output format of the PeopleSoft job. Valid values are:</p> <p><b>None</b></p> <p>PDF</p> <p><b>CSV</b></p> <p>PS</p> <p><b>DOC</b></p> <p>RPT</p> <p><b>Default</b></p> <p>RTF</p> <p><b>HP</b></p> <p>SPF</p> <p><b>HTM</b></p> <p>TXT</p> <p><b>LP</b></p> <p>WKS</p> <p><b>OTHER</b></p> <p>XLS</p> |

**Table 11. Task string parameters for PeopleSoft jobs (continued)**

| Parameter         | Description  |
|-------------------|--|
|                   |  <b>Note:</b> Depending on the PeopleSoft configuration, some combinations of the value of this option with the value of the <b>outputtype</b> option are not supported. In this case the PeopleSoft default value is used.   |
| -runlocationdescr | The PeopleSoft process scheduler responsible for processing the PeopleSoft job.  |
| -foldername       | The name of the report folder used for this job. The folder must have been already created using PeopleSoft Report Manager.  |
| tracelvl          | Specify the trace setting for the job. Possible values are: <ol style="list-style-type: none"> <li>1<br/>Only error messages are written in the trace file. This is the default.</li> <li>2<br/>Informational messages and warnings are also written in the trace file.</li> <li>3<br/>A most verbose debug output is written in the trace file.</li> </ol> Refer to <a href="#">Configuring the tracing utility on page 118</a> for detailed information. |



**Note:** No syntax checking is performed on the output control values (`outputdest`, `outputtype`, `outputformat`, and `foldername`). If the values are not recognized, defaults are used.

The following is an example of a task string specification for a PeopleSoft 8.44 job:

```
-process XRFWIN -type 'SQR Report' -runcontrol 1 -runlocationdescr PSNT
```

## Configuring the job status mapping policy

IBM Workload Scheduler calculates the status of an IBM Workload Scheduler job based on the PeopleSoft job Run Status and Distribution Status. In PeopleSoft, the run status monitors the running of the job until it reaches a final status; the distribution status monitors the status of the output of the job. If the final status of a PeopleSoft job is neither success nor warning, IBM Workload Scheduler ignores the distribution status and the IBM Workload Scheduler job status is ABEND.

If the final status of a PeopleSoft job is success or warning, you can decide whether to use the distribution status of the PeopleSoft job when determining the status of the IBM Workload Scheduler job by setting the PS\_DISTSTATUS option in the options file:

0

The distribution status is ignored and the IBM Workload Scheduler job status is calculated as shown in [Table 13: Relationship between the run status and the IBM Workload Scheduler job status on page 80](#).

1

The distribution status is used and the IBM Workload Scheduler job status is calculated as shown in [Table 12: Relationship between the run status, the distribution status, and the IBM Workload Scheduler job status on page 79](#). This is the default value.

[Table 12: Relationship between the run status, the distribution status, and the IBM Workload Scheduler job status on page 79](#) shows the relationship between the run status, the distribution status, and the IBM Workload Scheduler job status. The return code associated with the status is shown in parentheses. IBM Workload Scheduler uses this return code to evaluate the return code condition you specified in the **Return Code Mapping Expression** field in the Properties panel of the job definition. For more details about this field, refer to the online help by clicking the "?" in the top-right corner of the panel.

**Table 12. Relationship between the run status, the distribution status, and the IBM Workload Scheduler job status**

| PeopleSoft job run status  | PeopleSoft job distribution status  | IBM Workload Scheduler job status |
|--|---|-----------------------------------|
| <ul style="list-style-type: none"> <li>• Success (9)</li> <li>• Warning (17)</li> </ul>  | <ul style="list-style-type: none"> <li>• Posted (5)</li> <li>• None (0)</li> </ul>  | SUCC                              |
| <ul style="list-style-type: none"> <li>• Success (9)</li> <li>• Warning (17)</li> </ul>  | <ul style="list-style-type: none"> <li>• Not Posted (4)</li> <li>• Delete (6)</li> </ul>  | ABEND                             |
| <ul style="list-style-type: none"> <li>• Success (9)</li> <li>• Warning (17)</li> </ul>  | <ul style="list-style-type: none"> <li>• Not Available (1)</li> <li>• Processing (2)</li> <li>• Generated (3)</li> <li>• Posting (7)</li> </ul> | EXEC                              |
| <ul style="list-style-type: none"> <li>• Cancel (1)</li> <li>• Delete (2)</li> <li>• Error (3)</li> <li>• Canceled (8)</li> <li>• No Success (10)</li> <li>• Blocked (18)</li> <li>• Restart (19)</li> </ul> | Any distribution status   | ABEND                             |

[Table 13: Relationship between the run status and the IBM Workload Scheduler job status on page 80](#) shows the relationship between the PeopleSoft run status and the IBM Workload Scheduler job status. The return code associated with the status is shown in parentheses. IBM Workload Scheduler uses this return code to evaluate the return code condition you

specified in the **Return Code Mapping Expression** field in the Properties panel of the job definition. For more details about this field, refer to the online help by clicking the "?" in the top-right corner of the panel.

**Table 13. Relationship between the run status and the IBM Workload Scheduler job status**

| PeopleSoft final run status | IBM Workload Scheduler status |
|-----------------------------|-------------------------------|
| Cancel (1)                  | ABEND                         |
| Delete (2)                  | ABEND                         |
| Error (3)                   | ABEND                         |
| Hold (4)                    | WAIT                          |
| Queued (5)                  | WAIT                          |
| Initiated (6)               | INIT                          |
| Processing (7)              | EXEC                          |
| Canceled (8)                | ABEND                         |
| Success (9)                 | SUCC                          |
| No Success (10)             | ABEND                         |
| Pending (16)                | EXEC                          |
| Warning (17)                | SUCC                          |
| Blocked (18)                | ABEND                         |
| Restart (19)                | ABEND                         |



**Note:** If IBM Workload Scheduler fails to retrieve the status of the PeopleSoft job, the IBM Workload Scheduler job status is **DONE**.



## Chapter 10. Access method for z/OS

What you need to know and to do before using the Access method for z/OS.

Using Access method for z/OS you can schedule and control z/OS jobs using the job scheduling features of IBM Workload Scheduler.



**Note:** Throughout this publication, the term z/OS is used to refer also to supported versions of OS/390®.



**Note:** For detailed information, see System Requirements Document.

The access method for z/OS is installed automatically when you install a dynamic or a fault-tolerant agent.



**Important:** In order to be entitled to use the access methods and plug-ins, you must have purchased at least one of the following offerings: IBM Workload Scheduler, IBM Workload Scheduler for Applications, or IBM Z Workload Scheduler Agent. See the IBM Workload Scheduler Download document for details: [IBM Workload Scheduler download document](#). For information about the supported versions of the plug-ins and access methods, open the [Data Integration](#) report and select the **Supported Software** tab.

For information about the supported versions of the plug-ins and access methods, run the [Data Integration](#) report and select the **Supported Software** tab.

### Features

Using Access method for z/OS you can:

- Use IBM Workload Scheduler to schedule z/OS jobs to run at specific times and in a prescribed order.
- Define dependencies between IBM Workload Scheduler jobs running on different systems and operating systems.
- Define dependencies for IBM Workload Scheduler jobs based on the completion of z/OS jobs that were not launched by IBM Workload Scheduler.
- Define dependencies for IBM Workload Scheduler jobs based on the existence of files on a z/OS system.

### Roles and responsibilities

In a typical enterprise, different users contribute to the implementation and operation of the product. [Table 14: Roles and responsibilities in Access method for z/OS on page 82](#) describes the roles and responsibilities of all the users in the process model, showing the tasks they perform.

**Table 14. Roles and responsibilities in Access method for z/OS**

| User role                           | User task   |
|-------------------------------------|---|
| z/OS administrator                  | <ul style="list-style-type: none"> <li>• <a href="#">Installing, configuring, and uninstalling the z/OS gateway on page 82</a></li> <li>• <a href="#">Downloading z/OS gateway fixes from FTP on page 91</a></li> </ul> |
| IBM Workload Scheduler configurator | <a href="#">Defining the configuration options on page 94</a>   |
| IBM Workload Scheduler developer    | <a href="#">Defining z/OS jobs in IBM Workload Scheduler on page 96</a>   |

## Installing, configuring, and uninstalling the z/OS gateway

Access method for z/OS consists of the z/OS access method that must be located on the IBM Workload Scheduler agent, and of the gateway software that is located on the z/OS system.

The Access method for z/OS is installed automatically when you install a dynamic or a fault-tolerant agent.



**Important:** In order to be entitled to use the access methods and plug-ins, you must have purchased at least one of the following offerings: IBM Workload Scheduler, IBM Workload Scheduler for Applications, or IBM Z Workload Scheduler Agent. See the IBM Workload Scheduler Download document for details: [IBM Workload Scheduler download document](#). For information about the supported versions of the plug-ins and access methods, open the [Data Integration](#) report and select the **Supported Software** tab.

To install, configure, and uninstall the z/OS gateway, refer to the following sections.

- [Installing on page 82](#)
- [Configuring on page 85](#)
- [Uninstalling on page 86](#)

## Installing

You can install the z/OS gateway module in either of these two ways:

- Unload the files from the IBM® Workload Scheduler CD. See [Unloading the files from the CD on page 82](#).
- Unload the files from a 3480 tape cartridge written in non-IDRC (uncompressed) format. See [Unloading the files from the tape on page 84](#).

## Unloading the files from the CD

### About this task

The z/OS gateway files are stored in the `zos` directory of the product CD and are named:

- LOADLIB
- SAMPLES

To unload the files onto your z/OS system:

1. From your TSO session emulator, select the ISPF command shell (TSO command) and use the File Transfer utility (Send to Host) to transfer the LOADLIB library and SAMPLES member from the CD to the z/OS system, setting the transfer for a logical record length of 80 and a fixed record format.
2. Receive the members in output data sets using the `INDSN` option. This unloads 12 load modules into the output library and two samples into the sample library.

For example:

### LOADLIB

1. Issue the following command:

```
TSO RECEIVE INDSN('TWS4APPS.LOADLIB.L80')
```

A prompt is displayed similar to the following:

```
INMR901I Dataset TWS84.XAGENT.V8R4M0.FIXPAC04.DRV1511.LOADLIB
from TWSUSR2 on NODENAME NMR906A
Enter restore parameters or 'DELETE' or 'END' +
***
```

2. Reply:

```
da('TWS4APPS.LOADLIB')
```

where "da" means "data set" and the MVS™ data set name in quotes is the name you want for the output loadlib data set.

Some `IEBCOPY` messages are displayed as the library is uncompressed.

### SAMPLIB

1. Issue the following command:

```
TSO RECEIVE INDSN('TWS4APPS.SAMPLIB.L80')
```

A prompt is displayed similar to the following:

```
INMR901I Dataset TWS84.XAGENT.V8R4M0.FIXPAC04.DRV1511.SAMPLIB
from TWSUSR2 on NODENAME NMR906A
Enter restore parameters or 'DELETE' or 'END' +
***
```

2. Reply:

```
da('TWS4APPS.SAMPLIB')
```

where "da" means "data set" and the MVS data set name in quotes is the name you want for the output samplib data set.

Some `IEBCOPY` messages are displayed as the library is uncompressed.

## Unloading the files from the tape

### About this task

The z/OS gateway files are supplied on a 3480 tape cartridge written in non-IDRC (uncompressed) format.

Modify and submit the JCL below to unload the tape. Customize the job card and modify the following parameters according to your environment standards:

- Enter an appropriate job name.
- Identify a 3480 tape device.

```
//MVSXAUNL JOB (876903,D07),'OPCL3',MSGLEVEL=(1,1),
//          MSGCLASS=A,CLASS=A,NOTIFY=&SYSUID
//*****
//*
//* THIS IS THE JOB THAT UNLOADS THE WORKLOAD SCHEDULER FOR
//* APPLICATIONS z/OS Access Method Version 8.4 TO CUSTOMIZE
//*
//*****
//STEP01 EXEC PGM=IEBCOPY
//SYSPRINT DD SYSOUT=*
//INDD DD DSN=TWSX.V8R4M0.SAMPLES,
//       DISP=(OLD,PASS),UNIT=600,
//       VOL=SER=ABC001,
//       LABEL=(1,SL)
//OUTDD DD DSN=TWSX.V8R4M0.SAMPLES,
//       DISP=(NEW,CATLG),
//       SPACE=(32760,(2,2,10)),
//       DCB=(RECFM=FB,LRECL=80,BLKSIZE=0),
//       UNIT=3390,VOL=SER=OPC00C
//SYSUT3 DD UNIT=SYSDA,SPACE=(TRK,(20,1,10))
//SYSUT4 DD UNIT=SYSDA,SPACE=(TRK,(20,1,10))
//SYSIN DD *
        COPY OUTDD=OUTDD,INDD=((INDD,R))
//STEP02 EXEC PGM=IEBCOPY
//SYSPRINT DD SYSOUT=*
//INDD DD DSN=TWSX.V8R4M0.SERVICE.APFLIB1,
//       DISP=(OLD,PASS),UNIT=600,
//       VOL=SER=ABC001,
//       LABEL=(2,SL)
//OUTDD DD DSN=TWSX.V8R4M0.SERVICE.APFLIB1,
//       DISP=(NEW,CATLG),
//       SPACE=(32760,(50,50,50)),
//       DCB=(RECFM=U,BLKSIZE=32760),
//       UNIT=3390,VOL=SER=OPC00C
//SYSUT3 DD UNIT=SYSDA,SPACE=(TRK,(20,1,10))
//SYSUT4 DD UNIT=SYSDA,SPACE=(TRK,(20,1,10))
//SYSIN DD *
```

```
COPY OUTDD=OUTDD,INDD=((INDD,R))
//*
```

## Configuring

### About this task

To configure the z/OS gateway:

1. Authorize the `TWS4APPS.LOADLIB` in APF, or copy its contents into another authorized load library. See [Setting APF authorizations on z/OS on page 85](#) for details.
2. Add `EEWTCP00` to the `AUTHCMD` list in `IKJT000 (SYS1.PARMLIB)`
3. Set the RACF® permissions so that the user who will use the gateway can issue the `PARMLIB` command. See [Setting RACF authorizations on z/OS on page 86](#) for details.
4. Make the `IKJT000` change effective by performing an IPL, or by issuing the following command:

```
PARMLIB UPDATE(00)
```

5. Create a `PARMLIB` member with the appropriate startup parameters for `EEWSpace` and `EEWSERVE`.



**Note:** This member must have the `PACK OFF` option set in its profile. If `PACK ON` is set, the started task will end with `RC=04`.

6. Copy `EEWSpace` and `EEWSERVE` to the `PROCLIB` (from `SAMPLIB`) and edit it (for example, include `STEPLIB`, and specify the appropriate `PARMLIB` member name).
7. Verify that the TCP/IP port specified in the `PARMLIB` member is not in use. To do this, issue the following command and review the output:

```
TSO NETSTAT PORTLIST
```

If the port is in use, choose another port that is not in use and modify the `PARMLIB` member.

8. Ensure that the IEFU84 exit is enabled by checking the `SYS1.PARMLIB` member `SMFPRMxx`, or by issuing the following console command:

```
D SMF,0
```

If the `SMFPRMxx` member must be changed, to make the changes effective issue the command:

```
SET SMF=xx
```

9. Set the RACF® permissions for the started tasks `EEWSpace` and `EEWSERVE`. For details, see [Setting RACF authorizations on z/OS on page 86](#).
10. Start `EEWSpace`.
11. When `EEWSpace` is up, start `EEWSERVE`.

## Setting APF authorizations on z/OS

### About this task

This section describes how to authorize the load library in APF, by following these steps:

1. Issuing the **SETPROG** command from the console log. For example:

```
SETPROG APF,ADD,DSN=twsx.SERVICE.APFLIB1,
VOL=xxxxxx
```

where: xxxxxx is the volume serial number where the load library is located, or:

```
SETPROG APF,ADD,DSN=twsx.SERVICE.APFLIB1,VOL=SMS
```

which indicates a volume controlled by SMS.

2. Update the `PROGxx` member of `SYS1.PARMLIB`, or the authorization will be lost at your next IPL.
3. Add `EEWTCP00` to the `AUTCHCMD NAMES` section of `SYS1.PARMLIB (IKJTSOxx)`.

## Setting RACF authorizations on z/OS

### About this task

This section describes how to set RACF permissions.

To set the RACF permissions to authorize the `PARMLIB` command to be used by the user "userone", issue the following commands:

```
rdefine tsoauth parmlib uacc(upd)
permit parmlib class(tsoauth) id(userone) acc(upd)
setropts raclist(tsoauth) refresh
```

To set the RACF permissions for the started tasks `EEWSPACE` and `EEWSERVE`, issue the following commands:

```
redefine started EEWSpace.**
  stdata(user(<user_ID>) group(group_name))
redefine started EEWSERVE.**
  stdata(user(<user_ID>) group(group_name))
setropts raclist(started) refresh
```

## Uninstalling

### About this task

To uninstall the z/OS gateway:

1. Stop the started tasks `EEWSPACE` and `EEWSERVE`.
2. Cancel the `TWS4APPS.LOADLIB` library and the `TWS4APPS.SAMPLES` member.
3. Remove the started task entries from the RACF database by issuing the following commands:

```
rdelete started EEWSpace.**
rdelete started EEWSERVE.**
setropts raclist(started) refresh
```

## Additional information

The following topics provide additional information for the z/OS extended agent:

- [Gateway software components on page 87](#)
- [IEFU84 Exit on page 87](#)

- [Security on page 87](#)
- [SYSTSIN variables on page 88](#)
- [SYSTSIN variables on page 88](#)
- [z/OS gateway version on page 91](#)

## Gateway software components

The two z/OS program components of the IBM Workload Scheduler gateway are:

### **EEWTCP02**

This program establishes that IBM Workload Scheduler is tracking on the z/OS system. The program is started by the EEWSpace job.

### **EEWTCP00**

This is the “gateway” program that manages TCP/IP communications between IBM Workload Scheduler and the z/OS system. It is started by the EEWSERVE job. EEWTCP00 translates IBM Workload Scheduler commands to z/OS equivalents, routes z/OS information back to IBM Workload Scheduler, and performs EBCDIC-ASCII data conversions.

Both of the programs run as started tasks, with a TIME=NOLIMIT parameter. EEWTCP02 is always started first, followed by EEWTCP00. If the programs must be stopped for any reason, they should be stopped, not canceled, to ensure that they shut down properly without impacting other programs that use the IEFU84 Exit.

## IEFU84 Exit

The extended agent for z/OS tracks job streams using the IEFU84 exit. This exit must be turned on in the SMF parm member in SYS1.PARMLIB. IBM distributes a dummy IEFU84 exit with the operating system that is an IEFBR14 program. The EEWSpace job dynamically chains to the IEFU84 exit. If the IEFU84 exit is currently being used, EEWSpace will “front-end” the IEFU84 exit, obtain the information it requires, and then branch to the existing user exit. When EEWSpace is stopped, it removes itself from the chain and restores the chain to its original status. It is important to note that EEWSpace has no effect on any existing IEFU84 exits, which continue to run normally.

## Security

Security is enforced in several areas, usually, RACF, Top Secret, and ACF2. The EEWSERVE job must have the ability to submit jobs that run under the user IDs that are supplied in the JCL to be submitted. The JCL must not contain passwords. This can be authorized by using SURROGAT class resources in RACF, and the equivalents in ACF2 and Top Secret. PROPCNTL class resources in RACF can be used to prevent submitted jobs from running under the EEWSERVE user ID. ACF2 and Top Secret equivalents can also be used. Resource class JESJOBS in RACF, and ACF2 or Top Secret equivalents, can be used to control which job names and user IDs (with or without passwords) can be submitted by EEWSERVE.

## Startup

### **About this task**

Follow these steps:

1. Customize and start the EEWSpace procedure (following the commented instructions it contains) to start the extended agent Gateway Data Space. The job must be a started task and must not be canceled. See [SYSTSIN variables on page 88](#) for a description of the parameter settings. EEWSpace creates the Data Space and installs the IEFU84 exit. To stop the job, use the `STOP EEWSpace` command from any z/OS console.

**Note:**

- a. EEWSpace must be active before EEWSERVE is started.
  - b. To shut down, stop EEWSERVE before stopping EEWSpace.
2. Customize and start the EEWSERVE procedure by following the commented instructions it contains. For a description of the parameter settings, see [SYSTSIN variables on page 88](#).
  3. To stop the job, use the `STOP EEWSERVE` command from any z/OS console.

## SYSTSIN variables


[Table 15: SYSTSIN variables on page 88](#) lists all the SYSTSIN variables and their description. Modify the settings as required for your site configuration. The default values are shown in parentheses.

**Table 15. SYSTSIN variables**


| Variable                 | Description   |
|--------------------------|---|
| COMPLETIONCODE(LASTSTEP) | <p>Specifies the job completion code of a JES multi-step job. This variable can have one of the following values:</p> <p><b>LASTSTEP</b></p> <p>The completion code for a JES multi-step job is determined by the last run step in the job. This is the default value.</p> <p><b>MAXSTEP</b></p> <p>The completion code is determined by the highest completion code of any run step in the job.</p> <p>Any nonzero condition code in the last step (if LASTSTEP was selected) or in any step (if MAXSTEP was selected) causes the job to be considered unsuccessfully completed, unless differently specified using the condcode option in the job definition in IBM Workload Scheduler.</p> <p>If a step is flushed, it is not taken into consideration when determining the completion code of the job, unless the flushed step is the last one, in which case the job is always considered as completed unsuccessfully.</p> |



**Table 15. SYSTSIN variables (continued)**

| Variable                 | Description   |
|--------------------------|---|
| DEBUG(NO)                | If set to YES, it causes the gateway to output diagnostic messages. Use only in coordination with IBM Software Support.   |
| INTERLINKSUBSYSTEM(ACSS) | The name of the subsystem used by Interlink TCP/IP stack. This variable is ignored if Interlink is not used as TCP/IP stack.  |
| JESCMDCHR(\$)            | The job command recognition character. The default is set to dollar sign (\$) for JES2 systems and to asterisk (*) for JES3 systems. Change this variable only if a different command recognition character is being used.  |
| JESINTERFACE(CONSOLE)    | CONSOLE is the only supported value for JES and it is the default value. Set to NO if you do not use this interface.  |
| MAXWAIT(500)             | The maximum amount of time, in hundredths of a second, to wait for a response to commands. This variable is ignored if you set JESINTERFACE to NO.  |
| MCSSTORAGE(3)            | The amount of storage, in megabytes, used by each extended console used by the gateway. This variable is ignored if you set JESINTERFACE to NO.   |
| OPCINTERFACE(PIF)        | PIF is the only supported interface for IBM Z Workload Scheduler and is the default value for this variable. Set to NO if you do not use this interface.  |
| OPCMMSGCLASS(*)          | The message class for the dynamically allocated message logs used by IBM Z Workload Scheduler. The asterisk causes the class to be set to the same value as EEWSERVE. Ignored if IBM Z Workload Scheduler is not used.  |
| OPCSUBSYSTEM(OPCS)       | The subsystem name used for communications with the IBM Z Workload Scheduler control region.  |
| PEERADDRESS(0:0:0:0:0:0) | <p>The default, 0:0:0:0:0:0, permits access by any host. For better security, enter the IP address of the Workload Scheduler host of the z/OS extended agent.</p> <p> <b>Note:</b></p> |

**Table 15. SYSTSIN variables (continued)**

| Variable          | Description  |
|-------------------|--|
|                   |  <ol style="list-style-type: none"> <li>1. Depending on the Internet Protocol you are using, specify an IPv4 or IPv6 address by including also the "." (for IPv4) or ":" (for IPv6) between the 0s.</li> <li>2. To connect to an extended agent that supports only Internet Protocol version 4, you must use IPv4.</li> </ol> |
| PORT(5000)        | The TCP/IP port number used by IBM Workload Scheduler and the gateway for communications. This must be the same as the value entered in the TCP/IP address field of the z/OS extended agent workstation definition.  |
| PUTLINE(YES)      | When set to YES, it directs trace information to DDNAME SYSTSPRT.  |
| QLIMIT(2000)      | The maximum number of messages to be queued to an extended console.  |
| SUBSYS(UNIS)      | The prefix used by the extended agent for z/OS as the first four characters of extended console names. It is also used as the first four characters of internal reader DDNAMES. Change only in coordination with IBM Software Support.   |
| SVCDUMP(NO)       | When set to YES, abends cause a SVC dump. Use only in coordination with IBM Software Support.  |
| TCPIPSTACK(IBM)   | The vendor of TCP/IP stack (IBM, INTERLINK, or OPENCONNECT).   |
| TCPNAME(TCPIP)    | The name of the TCP/IP address space when the IBM version of TCP/IP stack is used.   |
| TERMINATOR(X'25') | The transaction termination character. Do not change the default unless asked to do so by IBM Software Support.  |
| WTP(NO)           | When set to YES, it directs trace information to SYSLOG as write-to-programmer information. This can be used if SYSTSPRT does not meet your needs.   |
| ZOSV1R2(NO)       | Set to YES if you are using the JES3 interface with z/OS V1R2 or later. This parameter is ignored if you are not using the JES3 interface, because:  |

**Table 15. SYSTSIN variables (continued)**

| Variable | Description  |
|----------|--|
|          | <ul style="list-style-type: none"> <li>If you are using the JES2 interface, the level of the operating system does not make any difference to the product</li> </ul> |

## z/OS gateway version

The version of `EEWSERVE` (and `EEWSPACE`) appears in the first line of the `EEWSERVE` (and `EEWSPACE`) log. For example:

```
EEWTCP10 VERSION RELEASE MODIFICATION LEVEL = VxRyMz
```

where `x` is the version, `y` the release, `z` the modification level.

## Downloading z/OS gateway fixes from FTP

### About this task

This section describes how to obtain the files in a fix or fix pack from the IBM software FTP site.

If a fix or fix pack for Access method for z/OS is issued by IBM, you can receive it by downloading the files from the IBM software FTP site.

Download the z/OS gateway fix pack files as follows:

- Allocate two data sets with `LRECL=80 RECFM=80` to hold the downloaded files. For example:
  - `TWS4APPS.LOADLIB.L80` (for the load library)
  - `TWS4APPS.SAMPLIB.L80` (for the samples library)

Use the file characteristics shown in [Table 16: File characteristics for obtaining the gateway fix pack files by FTP on page 91](#).

**Table 16. File characteristics for obtaining the gateway fix pack files by FTP**

| Characteristic       | Value |
|----------------------|-------|
| Organization         | PS    |
| Record format        | FB    |
| Record length        | 80    |
| Block size           | 27920 |
| 1st extent cylinders | 1     |
| Secondary cylinders  | 1     |



**Note:** These files are not allocated as type PDS but as regular sequential files.

- Use FTP to retrieve the `LOADLIB` and `SAMPLES` fix pack files from the download site, by logging in as anonymous, with your e-mail address as the password. Issue the following commands:

```
tso ftp ftp.software.ibm.com
anonymous
your_e-mail_address
cd software/support/patches/patches_8.4.0/
cd patch_name
cd ZOS
bin
get loadlib_file_name 'TWS4APPS.LOADLIB.L80' (rep
get samples_file_name 'TWS4APPS.SAMPLIB.L80' (rep
quit
```

For example, for Fix Pack 01 the variables in this list of commands would have the following values:

**patch\_name**

```
8.4.0-TIV-TWSWSE-FP0001
```

**loadlib\_file\_name**

```
LOADLIB_820WSEFP07
```

**samples\_file\_name**

```
SAMPLES_820WSEFP07
```



**Note:** The data set names in quotes on the get commands (the MVS file names) must match the files that were allocated in step 1 on page 91.

- The downloaded files are in an 80-byte packed format. To ensure that the files have been downloaded correctly, browse them. The beginning of the output should be similar to the following:

```
BROWSE TWS4APPS.LOADLIB.L80 Line
\INMR01. ....&.....NODENAME.....TWSUSR2.....A.....A.....20
..... \INMR02.....IEBCOPY.....
....."8. .... TWS84..XAGENT..V8R4M0..FIXPAC04..DRV1511..LO
```

If it is not, retry the downloads.

- Receive the downloaded data sets, as follows:

**LOADLIB**

- Issue the following command:

```
TSO RECEIVE INDSN('TWS4APPS.LOADLIB.L80')
```

A prompt is displayed similar to the following:

```
INMR901I Dataset TWS84.XAGENT.V8R4M0.FIXPAC04.DRV1511.LOADLIB
from TWSUSR2 on NODENAME NMR906A
Enter restore parameters or 'DELETE' or 'END' +
***
```

b. Reply:

```
da('TWS4APPS.LOADLIB')
```

where `da` means data set and the MVS data set name in quotes is the name you want for the output loadlib data set.

Some `IEBCOPY` messages are displayed as the library is uncompressed.

### SAMPLIB

a. Issue the following command:

```
TSO RECEIVE INDSN('TWS4APPS.SAMPLIB.L80')
```

A prompt is displayed similar to the following:

```
INMR901I Dataset TWS84.XAGENT.V8R4M0.FIXPAC04.DRV1511.SAMPLIB
from TWSUSR2 on NODENAME NMR906A
Enter restore parameters or 'DELETE' or 'END' +
***
```

b. Reply:

```
da('TWS4APPS.SAMPLIB')
```

where `da` means data set and the MVS data set name in quotes is the name you want for the output **samplib** data set.

Some `IEBCOPY` messages are displayed as the library is uncompressed.

After receiving the files, the file characteristics change to those shown in [Table 17: File characteristics for the LOADLIB file after receiving it on page 93](#).

**Table 17. File characteristics for the LOADLIB file after receiving it**

| Characteristic     | Value                |
|--------------------|----------------------|
| Data Set Name      | TWS4APPS.LOAD<br>LIB |
| Organization       | PO                   |
| Record format      | U                    |
| Record length      | 0                    |
| Block size         | 32760                |
| 1st extent blocks  | 10                   |
| Secondary blocks   | 5                    |
| Data set name type | PDS                  |

**Table 18. File characteristics for the SAMPLIB file after receiving it**

| Characteristic     | Value            |
|--------------------|------------------|
| Data Set Name      | TWS4APPS.SAMPLIB |
| Organization       | PO               |
| Record format      | FB               |
| Record length      | 80               |
| Block size         | 27920            |
| 1st extent blocks  | 4                |
| Secondary blocks   | 1                |
| Data set name type | PDS              |

Configure the downloaded fix pack files as described in [Configuring on page 85](#).

## Locating product support

To find the IBM Workload Scheduler support page, see the appendix on support information in *Troubleshooting Guide*.

Use the **Search Support** option to search for items of interest to you. Useful terms to enter for Access method for z/OS are: "TWS4APPS", message IDs, ABEND codes, "EEWSERVE", "MVS xagent", "TWS applications z/OS", or the interface types ("TWS for z/OS", JES2, JES3).

## Configuring the z/OS access method

IBM Workload Scheduler launches jobs on an extended agent or a dynamic agent for z/OS workstation. The supported agent for z/OS is defined in a standard IBM Workload Scheduler workstation definition, which gives it a name and identifies the access method to be used. The extended agent or dynamic agent for z/OS workstation is a workstation definition linked to an instance of the z/OS system.

To launch a job on a supported agent for z/OS workstation, IBM Workload Scheduler runs the access method, passing it information about the job. The access method communicates with the instance of the z/OS host and monitors the job through completion, writing job progress and status information to the job's standard list file.

See [Defining supported agent workstations on page 55](#) to learn how to define a supported agent workstation in IBM Workload Scheduler.

## Defining the configuration options

Every installed instance of the z/OS access method must have a matching options file. You can create it during or after the installation of the access method with either the Option Editor (see [Setting options for the access methods on page 46](#)) or any common text editor.

The options file must be located on the IBM Workload Scheduler hosting computer for the extended agent or dynamic agent in the following directory:

**On UNIX operating systems**

`TWA_DATA_DIR/methods`

**On Windows operating systems**

`TWA_home\methods`

If you do not create one, the agent uses by default one of the global options files (either `mvsjes.opts` or `mvsopc.opts`).

[Table 19: Access method for z/OS access method options on page 95](#) describes the options that you can define for the z/OS access method.

**Table 19. Access method for z/OS access method options**

|  |  |
|--|--|
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

**Table 19. Access method for z/OS access method options (continued)**

| Options File Entries     | Description   |
|--------------------------|---|
| LJUSER= <i>name</i>      | (Optional <sup>1</sup> ) Assigns the user name used by the access method to launch jobs (LJ tasks). This must be a valid UNIX or Windows user who submits local jobs and can connect to the IBM Workload Scheduler z/OS gateway on the z/OS system. The default is the login parameter in the job definition. |
| RETRYCOUNT= <i>count</i> | (Optional) Defines the number of times a status check is attempted before IBM Workload Scheduler writes a timeout message to a job's stdlist file, and marks it in the abend state. For details, see options <b>CHECKINTERVAL</b> and <b>BLOCKTIME</b> . The default is 10.                                   |

**Note:**

1. For best results, allow *LJUSER*, *CFUSER*, and *GSUSER* to take the default values.

## Defining jobs in z/OS

In z/OS, jobs that are scheduled with IBM Workload Scheduler are defined as described in the following sections:

- [For JES jobs on page 97](#)
- [For IBM Z Workload Scheduler jobs on page 97](#)

## Defining z/OS jobs in IBM Workload Scheduler

IBM Workload Scheduler job definitions are required for each z/OS job you that want to schedule and launch with IBM Workload Scheduler. They are defined in the same ways as other IBM Workload Scheduler jobs and include job name, user name, special script name options, and optional recovery options.

Remember that you should include neither special characters, other than dash (-) and underscore (\_), nor national characters in the IBM Workload Scheduler job name. Such characters are not supported in z/OS, and when the IBM Workload Scheduler job is passed to z/OS by the access method, z/OS rejects the name and abends the job if it finds them.

See [Defining jobs for supported agents on page 61](#) for reference.

## Task definition syntax for z/OS jobs scheduled with IBM Workload Scheduler

The following are descriptions of the task definition syntax (command line "scriptname") for z/OS jobs that IBM Workload Scheduler schedules and launches from extended agent workstations using the **mvsjes** (JES2/3 jobs) or **mvsopc** (IBM Z Workload Scheduler jobs) methods.

You specify these task string parameters in the following places when you define their associated IBM Workload Scheduler jobs:



- In the **Task string** field of the Task page of the Properties - Job Definition panel, if you use the Dynamic Workload Console
- As arguments of the `scriptname` keyword in the job definition statement, if you use the IBM Workload Scheduler command line.
- As arguments of the `JOBCMD` keyword in the `JOBREC` statement in the `SCRIPTLIB` of IBM Z Workload Scheduler, if you are scheduling in an end-to-end environment.

## For JES jobs

The syntax is:

```
dataset [<|= condcode]
```

where:

### **dataset**

Specifies the JES job data set or the name of a member of a partitioned data set.

### **condcode**

Specifies the condition code that indicates successful job completion. If preceded by `<`, the condition code must be less than or equal to this value. If preceded by `=`, the condition code must be equal to this value. If omitted, `" = 0000?"` is used. Note that there must be a space on both sides of the operator (`<` or `=`).

## Example

### Example

```
gold.apayable.cntl(apayjob1) = 0004
```

## For IBM Z Workload Scheduler jobs

The syntax is:

```
appl [IA(yymmddhhmm) | IATIME(hhmm)] [...]
```

```
[DEADLINE(yymmddhhmm) | DEADLINETIME(hhmm)]
```

```
[PRIORITY(pri)]
```

```
[CPDEPR(Y|N|P|S)]
```

where:

### **appl**

The name of the IBM Z Workload Scheduler application to be inserted into the current plan.

### **IA**

The input arrival date and time in the form: `yymmddhhmm`.

### **IATIME**

The input arrival time in the form: `hhmm`.

### DEADLINE

The deadline arrival date and time in the form: yymmddhhmm.

### DEADLINETIME

The deadline arrival time in the form: hhmm.

### PRIORITY

The priority (1-9) at which to run the application.

### CPDEPR

The current plan dependency resolution selection.

#### Y

Add all successor and predecessor dependencies.

#### N

Do not add any dependencies, (the default.)

#### P

Add predecessor dependencies.

#### S

Add successor dependencies.

For complete descriptions of the parameters, refer to the IBM Z Workload Scheduler documentation.

## Example

### Example

```
PREFABJOB44 IA(0202181000) PRIORITY(5) CPDEPR(Y)
```

## Task definition syntax for other z/OS jobs

The following are descriptions of the task definition syntax (command line *scriptname*) for z/OS jobs that are to be monitored for completion. The completion of these z/OS jobs can be used as *follows* dependencies for IBM Workload Scheduler-launched jobs. The jobs to be monitored can be JES or IBM Z Workload Scheduler.

IBM Workload Scheduler monitors these jobs until their status changes to *success*.

The details of the outcome of such jobs must be checked in the subsystem where the jobs were launched. IBM Workload Scheduler only records whether or not these jobs completed successfully. To find the reason for the failed submission or completion of one of these jobs, or to check for dependency failures, work with the host subsystem operator who can obtain this information from the EEWSERVE log.

The basic syntax is:

```
tws-job follows XAname::"mvs-job"
```

where:

***tws-job***

The name of the IBM Workload Scheduler job that depends on the completion of the specified z/OS job.

***XAname***

The name of the IBM Workload Scheduler extended agent workstation associated with the scheduler of the z/OS job, that is, an extended agent defined with the **mvsjes** or **mvsopc** method. The two colons (::) are a required delimiter.

***mvs-job***

The identification of the z/OS job. This string must be enclosed in quotation marks. See the syntax descriptions below.

## For JES jobs

The syntax is:

```
"jobname[<|= condcode]"
```

where:

***jobname***

The name of the job in JES.

***condcode***

The condition code that indicates successful job completion. If preceded by < , the condition code must be less than or equal to this value. If preceded by =, the condition code must be equal to this value. If omitted, " = 0000? is used. There must be a space on both sides of the operator (< or =).

## Example

```
job5 follows jesworkstation::"apayable = 0004"
```

## For IBM Z Workload Scheduler jobs

The syntax is:

```
"application[IA(yymmddhhmm) | IATIME(hhmm)] [...]"
```

```
[JOBNAME(jobname)]
```

```
[OPNO(num)]
```

where:

***application***

The name of the IBM Z Workload Scheduler application (job stream) in the current plan.

***IA***

The input arrival date and time.

**IATIME**

The input arrival time.

**JOBNAME**

The z/OS job name.

**OPNO**

The operation number (1-255). If included, the application is considered completed when it reaches this operation number.

For complete descriptions of the parameters, refer to the IBM Z Workload Scheduler documentation. For example:

```
joba follows tsworkstation::"PREFABJOB44 IA(0202181000) JOBNAME(PFJ3)"
```

## Operational considerations for the EEWSERVE gateway task

The following considerations apply:

**EEWSERVE not running**

If the EEWSERVE task on the mainframe is not running, and an IBM Workload Scheduler job with no follows dependency is submitted from the extended agent, the job will show an *error* status and will fail, that is, the job will not run after the EEWSERVE task is started. However, if an IBM Workload Scheduler job has a follows dependency for an external (non-IBM Workload Scheduler) job which runs under JES or Access method for z/OS, the internal check job (CJ) command is reissued after EEWSERVE is started. The extended agent workstation still shows its status as *linked* even if EEWSERVE is not running.

For this reason, if a z/OS automation product such as NetView® is available on the mainframe, write a rule to detect any outages of the EEWSERVE task.

**Instance limitations in LPARs**

Due to the ENQ/DEQ mechanism in use, only one instance of the EEWTCP02 task (default name EEWSpace) can be run on a z/OS LPAR. If a second instance is started, it fails with RC=04. So even if you use different started task names and PORT numbers, only one instance of EEWSpace or EEWSERVE can exist concurrently on a z/OS LPAR.

## File (OPENS) dependencies syntax on z/OS files

IBM Workload Scheduler jobs and job streams can use z/OS files as dependencies. The basic syntax is:

```
tws-job opens XAname#"hlq1.hlq2.hlq3"
```

where:

**tws-job**

The name of the IBM Workload Scheduler job dependent on the specified z/OS file.

**XAname**

The name of the IBM Workload Scheduler extended agent workstation associated with the scheduler of the z/OS job, that is, an extended agent defined with the **mvsjes** or **mvsopc** method.



**Note:** The # sign is a required delimiter.

**hlq1.hlq2.hlq3**

The identification of the z/OS file in high level qualifier terms.



**Note:** This string must be enclosed in quotation marks.

For more information, see [Checking for files on z/OS on page 105](#).

## Reference information

This section describes job states when operating on JES and IBM Z Workload Scheduler in the IBM Workload Scheduler environment.

## Technical overview

The z/OS gateway uses an extended MCS console to communicate with JES. The program issues the **MCSOPER** macro to activate an extended MCS console. The z/OS gateway can then receive messages and command responses by issuing the **MCSOPMSG** macro, and can issue commands by issuing the **MGCRE** macro. All the return codes from the extended MCS macros are handled as described in *IBM® z/OS® Programming: Authorized Assembler Services Reference, Volume 3, SA22-7611*.

## Managing JES jobs

The following sections describe how to manage JES jobs.

### Launching JES jobs

To launch and monitor a JES job, IBM Workload Scheduler passes the name of the JCL data set or partition data set it wants to run to the z/OS gateway, which, in turn, submits it to JES. Submissions occur using dynamically allocated internal readers in JES. The gateway allocates an internal reader at the start of each task and then submits the job to the reader.

When a job is submitted, the job name and JES job ID are also entered in the Tablespace. When an SMF record containing relevant job scheduling data is passed through the IEFU84 exit, the job and condition code information are made available to IBM Workload Scheduler. Because IBM Workload Scheduler keeps track of both the job name and the JES job ID, it can check for the specific job it submitted. (Currently, the Gateway uses Type 30 SMF records and also subtypes 1, 4, 5.)

IBM Workload Scheduler checks submitted jobs periodically to see if they are active. If an IBM Workload Scheduler-submitted job is not active and no information about it is found through the IEFU84 exit, the job is marked as **abend** in IBM Workload Scheduler displays. This situation might occur if a job fails for security reasons or JCL syntax problems.

## JES job states

Table 20: JES job states with respect to IBM Workload Scheduler on page 102 lists JES job states with respect to IBM Workload Scheduler.

**Table 20. JES job states with respect to IBM Workload Scheduler**

| IBM Workload Scheduler Job State | JES Job State | Comment  |
|----------------------------------|---------------|--|
| <b>intro</b>                     | Not available | IBM Workload Scheduler is starting the method.   |
| <b>wait</b>                      | Queued        | Job is queued.   |
| <b>wait</b>                      | Not available | If the job remains in this state, it might be due to a security violation in z/OS. Check the job on the z/OS system.   |
| <b>exec</b>                      | Executing     | Job is running.  |
| <b>succ</b>                      | Completed     | Job's condition code meets the completion criteria in the IBM Workload Scheduler job definition.   |
| <b>abend</b>                     | Completed     | Job condition code does not meet the completion criteria in the IBM Workload Scheduler job definition, or a system or user abend has occurred. System abend codes, in hexadecimal, are prefixed with "S", and user abend codes, in decimal, are prefixed with "U". Both types of code are written to the job stdlist file. |
| <b>extrn</b>                     | Not available | Status unknown. Can occur only when checking a job that is used as a dependency.   |

## Monitoring JES jobs

The details of the outcome of JES jobs must be requested from the subsystem where these jobs were launched. From IBM Workload Scheduler you should only expect to find out if these jobs completed successfully. To find the reason for a failed submission or failed completion of one of these jobs or to check for dependency failures, the IBM Workload Scheduler operator should work with the host subsystem operator who can obtain this information from the EEWSERVE log.

## Checking JES jobs

To check a JES job that was not launched by IBM Workload Scheduler, the name of the job is passed by IBM Workload Scheduler to the gateway. Because IBM Workload Scheduler did not submit the job, the JES job ID is not available. The Gateway enters the name in the Tablespace, and waits for information about the job to appear in SMF records passed through the IEFU84 exit.

The IEFU84 exit cannot handle every job without impacting the performance of the entire system because it is invoked for each job running on the z/OS system.

- If the job is not present in the gateway dataspace, the IEFU84 exit does not perform any action.
- If the job is submitted by IBM Workload Scheduler, the gateway inserts the job into the dataspace. In this case the IEFU84 exit monitors the status of the job and of each step contained in the job.
- If the job is not submitted by IBM Workload Scheduler, the gateway inserts the job into the dataspace only if the gateway receives a request from IBM Workload Scheduler to check its status because the job represents an internetwork dependency.

To have the internetwork dependencies of a z/OS job correctly handled by IBM Z Workload Scheduler system, ensure that there are no occurrences of the z/OS job in any job queue including the output queue. If any occurrences of the z/OS job are present then purge them. The internetwork dependencies of a z/OS job are handled by IBM Workload Scheduler in the following ways:

- If there are no occurrences of z/OS jobs in the job queues, the gateway inserts the job into the dataspace the first time it receives the request from IBM Workload Scheduler to check the job status. The gateway inserts the job into the dataspace with an unknown job ID ready to be monitored.
- When the z/OS job is submitted, the IEFU84 exit finds the job in the dataspace and updates the corresponding entry with the JES job ID. From now on the z/OS job is monitored using the associated JES job ID. If the job completes successfully, the gateway returns the information to IBM Workload Scheduler, and the internetwork dependency is correctly resolved.

## Managing IBM Z Workload Scheduler jobs

The following sections describe how to manage IBM Z Workload Scheduler jobs.

### Launching IBM Z Workload Scheduler jobs

To launch and monitor an IBM Z Workload Scheduler job, IBM Workload Scheduler passes the application name, and other optional parameters, it wants to run to the z/OS Gateway. If it exists in the IBM Z Workload Scheduler database, the application is inserted into the current plan. The input arrival, deadline arrival, priority, and automatic dependency resolution parameters, if included, override any values specified in IBM Z Workload Scheduler.

At a rate defined by the **CheckInterval** value in the method options file, IBM Workload Scheduler checks the status of the occurrence (application) in IBM Z Workload Scheduler.

### IBM Z Workload Scheduler operation states

[Table 21: IBM Z Workload Scheduler operation states with respect to IBM Workload Scheduler on page 103](#) lists IBM Z Workload Scheduler operation states with respect to IBM Workload Scheduler.

**Table 21. IBM Z Workload Scheduler operation states with respect to IBM Workload Scheduler**

| IBM Workload Scheduler Job State | IBM Z Workload Scheduler Operation State |
|----------------------------------|--|
| wait                             | pending                                  |
| wait                             | undecided                                |

**Table 21. IBM Z Workload Scheduler operation states with respect to IBM Workload Scheduler (continued)**

| IBM Workload Scheduler Job State | IBM Z Workload Scheduler Operation State |
|----------------------------------|--|
| wait                             | wait                                     |
| wait                             | ready                                    |
| exec                             | started                                  |
| succ                             | complete                                 |
| abend                            | interrupted                              |
| abend                            | error                                    |
| abend                            | deleted                                  |
| abend                            | Not applicable                           |
| extrn                            | Not applicable                           |

## IBM Z Workload Scheduler occurrence states

[Table 22: IBM Z Workload Scheduler operation occurrence states with respect to IBM Workload Scheduler on page 104](#) lists IBM Z Workload Scheduler operation occurrence states with respect to IBM Workload Scheduler.

**Table 22. IBM Z Workload Scheduler operation occurrence states with respect to IBM Workload Scheduler**

| IBM Workload Scheduler Job Stream State | IBM Z Workload Scheduler Occurrence State  |
|---|--|
| wait                                    | pending  |
| wait                                    | undecided  |
| exec                                    | started  |
| succ                                    | complete   |
| abend                                   | error  |
| abend                                   | deleted  |
| abend                                   | Not applicable   |
| extrn                                   | Not applicable. Status unknown. Can occur only when checking a job that is used as a dependency. |

## Checking IBM Z Workload Scheduler jobs

To check an IBM Z Workload Scheduler job that was not launched by IBM Workload Scheduler, the name of the application, and optionally the operation, is passed to the gateway. A check is made to see if the occurrence or operation is in the current



plan. If it is not found, IBM Workload Scheduler rechecks at a rate defined by the **bm check status** value in its local options file.

## Checking for files on z/OS

The existence of a file can be used as a job dependency in IBM Workload Scheduler. To check for the existence of a file on z/OS, IBM Workload Scheduler passes the file name to the Gateway. The file name is allocated with DISP=OLD, and is considered to exist if the following conditions apply:

- The data is cataloged
- It is allocated
- It is not being used by another task

If the data set does not exist, IBM Workload Scheduler continues to wait and check for the file at a frequency determined by the `bm check file` option in the `localopts` file of the fault-tolerant workstation that is hosting the extended agent. The `localopts` options are described in the *Planning and Installation Guide*.



**Note:** IBM Workload Scheduler can only use fully qualified data set names for non-partitioned files. If a Generation Data Group name is to be used, it must be the fully qualified name and not a relative name (for example, `xxxxx.xxxxx(-1)` cannot be used).

## Timing considerations

When IBM Workload Scheduler checks dependencies on z/OS jobs *not* launched by IBM Workload Scheduler, certain timing issues are critical to ensuring that any associated job dependencies are correctly resolved. For the correct resolution of these external dependencies, IBM Workload Scheduler must attempt to resolve the dependency at least once *before* the z/OS job is submitted. After the z/OS job has been submitted and has successfully completed, the next periodic check of the dependency by IBM Workload Scheduler can manage the dependency.

External dependencies are checked by IBM Workload Scheduler in the following circumstances:

- If the external dependency on an IBM Workload Scheduler z/OS job is the only dependency in the job, the dependency is checked immediately after the plan is generated or extended. However, as the plan might have a period of several days, weeks, or months, this might not be very frequently.
- Subsequently to the first check, the dependency is checked with a frequency determined by the IBM Workload Scheduler configuration parameters.
- If the external dependency is preceded by another dependency, the external dependency is not checked until the other dependency is resolved.

Thus, when creating external dependencies in IBM Workload Scheduler on IBM Workload Scheduler z/OS jobs, you should schedule the job so that the first dependency check takes place before the z/OS job is submitted.

If this synchronization is not taken into account, IBM Workload Scheduler might wait indefinitely to resolve a job dependency. A similar problem can occur as the result of a communication failure between the z/OS and IBM Workload Scheduler environments that prevents IBM Workload Scheduler from determining the status of a z/OS job to satisfy a job dependency.

## Diagnostic information

z/OS jobs submitted by IBM Workload Scheduler can fail to complete for a number of reasons. The step in the submission process in which a job fails determines how much information is available and is provided by IBM Workload Scheduler as follows:

- If a job fails before it is actually initiated (usually the result of a JCL or security problem), IBM Workload Scheduler recognizes that it no longer exists, and marks it as abend in the `conman` command line displays. No further information is provided.
- If a job fails after being started, IBM Workload Scheduler:
  1. Obtains its condition code and user abend code, if any
  2. Writes them to the job standard list file
  3. Marks the job as **abend** in the `conman` command line or Dynamic Workload Console displays

Job standard lists can be displayed with the `conman` command line and with the Dynamic Workload Console.

## Troubleshooting

To assist in troubleshooting, ensure that the JES log is obtained for the EEWSpace and EEWSERVE started tasks. This helps in determining the context in which a message was issued. Depending on the job scheduling interface you use, additional helpful information might be obtained from other logs.

```
EEWI27I APPLICATION application WAS INSERTED IN CP WITH INPUT
ARRIVAL DATE AND TIME yymmddhhss
```

```
EEWI28W yymmdd hhhmss APPLICATION appl WAS NOT INSERTED IN
CURRENT PLAN WITH INPUT ARRIVAL DATE AND TIME iadatetime
```

```
EEWI29I yymmdd hhhmss TASK task MODULE module ISSUED, MACRO macro NEAR LABEL label
WITH RETURN CODE = code AND ERROR NUMBER = err
```

```
EEWI30S yymmdd hhhmss module CA7SPAN MUST BE 4 DIGITS IN FORMAT HHMM
```

```
EEWI31E TASK task MODULE module LAUNCH OF JOB 'jobname' FAILED
```

```
EEWI32S yymmdd hhhmss module AT LEAST ONE INTERFACE MUST BE DIFFERENT FROM NO
```

```
EEWI33W yymmdd hhhmss TASK task APPLICATION application NOT FOUND
```

```
EEWI34W APPLICATION application NOT FOUND
```

```
EEWI35W JCL dataset(member) NOT FOUND
```

```
EEWI36W yymmdd hhhmss IA and IATIME cannot be specified together
```

```
EEWI37W yymmdd hhhmss DEADLINE and DEADLINETIME cannot be specified together
```

```
EEWI38I jobname(jobid) n1 n2 result (restype)
```

- n1 indicates the number of seconds passed from the request
- n2 indicates the number of seconds of CPU time consumed
- *result* can assume one of the following values:

**ABEND**

If the job abends. In this case *restype* can be:

**Sxyz**

In case of System Abend

**Unnnn**

in case of User Abend

**CONDCOD**

If the job does not end successfully due to the condition code of one step that does not match the definition. In this case *restype* contains: the RC=nnnnn value of the return code of the last step that has been run, if LASTSTEP specified, or of the worst step that does not match the definition of the job on the distributed side.

**EXEC**

If the job is running or is in the input queue.

**JCLERRO**

If the job failed due to a JCL error.

**SUCCESS**

If the job completed successfully.

**UNKNOWN**

If the jobid is unknown

**blank**

In case of an internetwork dependency when the manual submission was not performed.



**Note:** All the above messages are written in the EEWSpace or in the EEWSERVE log files. These are the files indicated in the SYSTSPRT DD card of the respective procedure. In the files the messages are written starting from column 1, except for the messages that do not contain the date and time after the message identifier, for example EEWI27I. These messages appear with different characteristics in the z/OS® system and in IBM Workload Scheduler. In the z/OS® system log the messages appear in the text of another message and in some cases they might appear truncated. This is because the maximum length of each text record is limited to 251 characters. In IBM Workload Scheduler they are always displayed in their complete form.

The module names are:

| Module Name | Description                                      |
|-------------|--|
| EEWPRE84    | Previous SMF exit                                |
| EEWTCP00    | Main processing routine                          |
| EEWTCP01    | Server test vehicle                              |
| EEWTCP02    | Main dataspace construction routine              |
| EEWTCP05    | Establish ESTAE routine to issue failure message |
| EEWTCP07    | Find data set name associated with open ACB/DCB  |
| EEWTCP08    | Find data set name associated with DDNAME        |
| EEWTCP10    | Initialize and examine variables                 |
| EEWTCP15    | Locate and initialize control blocks             |
| EEWTCP20    | Locate and initialize control blocks             |
| EEWTCP21    | Client test vehicle                              |
| EEWTCP22    | Client test vehicle                              |
| EEWTCP23    | Client test vehicle                              |
| EEWTCP25    | Concurrent server                                |
| EEWTCP26    | Concurrent server Interlink TCP/IP provider      |
| EEWTCP27    | Concurrent server for Openconnect TCP/IP stack   |
| EEWTCP30    | Child server task IBM Workload Scheduler         |
| EEWTCP31    | Child server task for Interlink TCP/IP stack     |
| EEWTCP32    | Child server task                                |
| EEWTCP84    | SMF record exit for SMFEWTM                      |
| EEWTCP87    | IBM Workload Scheduler interface                 |
| EEWTCP88    | IBM Workload Scheduler interface post            |
| EEWTCP89    | CA-7 BTI   |
| EEWTCP90    | Issue command and wait for response              |
| EEWTCP91    | Issues TERROR to format messages and issues WTOS |
| EEWTCP92    | Find substring within string                     |
| EEWTCP93    | Issue CA-7 command and wait for response         |
| EEWTCP94    | STIMER exit to post ECB past in parm             |

| Module Name | Description   |
|-------------|---|
| EEWTCP95    | Calls IKJEFF02 to extract buffer using EEWTCP99     |
| EEWTCP96    | ESTAE routine to issue failure message              |
| EEWTCP97    | Calls IKJEFF19 (DAIRFAIL/VSAMFAIL) to issue message |
| EEWTCP98    | Calls IKJEFF02 to issue message from EEWTCP99       |
| EEWTCP99    | Message table                                       |
| EEWTCPC7    | Check CA-7 job                                      |
| EEWTCPCA    | Check application request handler                   |
| EEWTCPCF    | Check file request handler                          |
| EEWTCPCJ    | Check job request handler                           |
| EEWTCPCO    | Check operation request handler                     |
| EEWTCPCV    | Enumerate job                                       |
| EEWTCPED    | String encrypt/decrypt                              |
| EEWTCPEJ    | Enumerate job request handler                       |
| EEWTCPFJ    | Free job request handler                            |
| EEWTCPIA    | Insert application                                  |
| EEWTCPIE    | String initialization                               |
| EEWTCPKJ    | Kill job request handler                            |
| EEWTCPKO    | Delete IBM Workload Scheduler application           |
| EEWTCPL7    | Launch CA-7 job request handler                     |
| EEWTCPLJ    | Launch job request handler                          |
| EEWTCPLO    | Insert IBM Workload Scheduler application           |
| EEWTCPQ7    | Query CA-7 job request handler                      |
| EEWTCPQJ    | Query job request handler                           |
| EEWTCPQO    | Query IBM Workload Scheduler application            |
| EEWTCPQS    | Query subsystem request handler                     |
| EEWTCPRC    | Return code   |
| EEWTCPSC    | System abend  |
| EEWTCPSE    | String encryption/decryption                        |

| Module Name | Description                       |
|-------------|-----------------------------------|
| EEWTCPUC    | User abend                        |
| EEWTCPWT    | Wait for specified amount of time |
| EEWTCPXX    | Invalid request handler           |

APAR PQ88345 add note below.

To assist in troubleshooting, be sure to obtain the JES log for the EEWSpace and EEWSERVE started tasks. This will help in determining the context in which a message was issued. Depending on the job scheduling interface you use, additional helpful information may be obtained from other logs. For example, if you use CA-7, you should obtain the following:

- The CA-7 log
- The console log for the interval covering the test period
- The job log of the job resulting in error (if this is the case)
- The UNIX® script file related to that job

# Chapter 11. Common serviceability for the access methods

This section provides information common to all the access methods including return code mapping, configuring the tracing utility, and troubleshooting the access method.

## The return code mapping feature

The return code mapping feature provides a standard way of mapping messages into return code values. You can also customize the return code mapping. This feature is available for the following access methods:

- PeopleSoft
- SAP

The return code mapping feature provides more granularity when defining the success or failure policies of jobs and improved flexibility in controlling job execution flows based on execution results. Job return code mapping provides the following capabilities:

- Users can define a job final status (successful or failed) based on a condition on the return code of the execution of the program or script of the job.
- The return code can be provided also to the recovery job that is associated with it in the job definition. This causes the recovery job to perform different processing based on the return code.

## Parameters

#

Optional comment. All the lines starting with this symbol (#) are not used for mapping.

### **pattern**

Pattern strings delimited by quotation marks (" and "). If you use only one pattern string, you can omit the quotation marks. If the pattern string contains a quotation marks character, then it must be escaped by backslash (\). The string can contain the following wildcards and special characters:

#### **Asterisk (\*)**

Matches an arbitrary number of characters.

#### **Question mark (?)**

Matches a single character.

#### **Backslash (\)**

Escape character.

### **RC value**

The return code value. This value is sent by the method to IBM Workload Scheduler by a `%RC nnnn` message.

## Creating a return code mapping file

You can create a return code mapping file to customize your own return codes with respect to certain conditions that might affect a job when it runs. Use this file to set the success condition of the job, which IBM Workload Scheduler uses to assess if the job completes successfully or in error. The return code is sent to IBM Workload Scheduler in the form of a `%RC nnnn` message. If this message is received, the job state is updated accordingly.

Each method has its own set of files to map the messages into return code values. The mapping files can be either global or local for a workstation.

Return code mapping files that are specific to a workstation are named according to the following scheme:

```
TWA_DATA_DIR/methods/rcm/accessmethod-type-workstation.rcm
```

```
TWA_home\methods\rcm\accessmethod-type-workstation.rcm
```

Global mapping files have a file name according to the following scheme:

```
TWA_DATA_DIR/methods/rcm/accessmethod-type.rcm
```

```
TWA_home\methods\rcm\accessmethod-type.rcm
```

For the PeopleSoft access method, *type* is always equal to `rcmap`. For the SAP R/3 access method, *type* is as described in [Return code mapping file names for r3batch on page 115](#).

## Syntax

### About this task

Use the following syntax to create the return code mapping file:

```
[#] "pattern1? "pattern2"... "patternn" = RC value
```

## Examples

The following is an example of a return code mapping file. The line numbers in bold do not belong to the file, but are shown for reference:

```
1. # This is an RC mapping file for joblog.
2.
3. "User * missing = 102
4. "\*\*\*? = 103
5. "User \
6. * \
7. missing = 102
```

In this example:



- Line 1 is a comment and is not used for mapping.
- Line 2 is blank and is ignored. All blanks preceding or following a pattern string are ignored, as well as those between the equals sign and the return code value.
- Line 3 matches every message starting with the string *User* and ending with the string *missing*.
- Line 4 matches every message starting with three asterisks (\*) followed by a blank. When you use the asterisk in this way and not as a wildcard, you must escape it with a backslash.
- Lines 5 through 7 contain a pattern taking several lines. It matches the same messages as the pattern of line 3.

## Considerations

Note the following facts:

- The order of the pattern lines is important because the first matching pattern line is used to build the return code value.
- Empty pattern strings ("") are ignored by the pattern matching procedure.

For example, the following is a valid pattern sequence. The first line is more restrictive than the second line.

```
"625 "User * missing = 104
" "User * missing = 102
```

The following pattern sequence is formally valid, but the second pattern line is never used. Because the first line is more general, it is always matched first.

```
" "User * missing = 102
"625 "User * missing = 104
```

## Return code mapping for psagent

For the PeopleSoft access method, you can write return code mapping files associating the internal states listed in [Table 23: Job states and return codes for the PeopleSoft access method on page 113](#).

When no return code mapping files are defined, or when a string returned by the access method does not satisfy any of the matching patterns of the mapping file, the access method uses the respective standard return codes listed in the tables.

**Table 23. Job states and return codes for the PeopleSoft access method**

| psagent job state | psagent return code |
|-------------------|---------------------|
| "CANCEL"          | 1                   |
| "DELETE"          | 2                   |
| "ERROR"           | 3                   |
| "HOLD"            | 4                   |
| "QUEUED"          | 5                   |
| "INITIATED"       | 6                   |

**Table 23. Job states and return codes for the PeopleSoft access method (continued)**

| psagent job state  | psagent return code |
|--------------------|---------------------|
| "PROCESSING"       | 7                   |
| "CANCELED"         | 8                   |
| "SUCCESS"          | 9                   |
| "NO SUCCESSPOSTED" | 10                  |
| "POSTED"           | 11                  |
| "NOT POSTED"       | 12                  |
| "RESEND"           | 13                  |
| "POSTING"          | 14                  |
| "GENERATED"        | 15                  |

## Return code mapping for r3batch

### About this task

Using return code mapping with `r3batch` can be useful in overcoming differences in the return code mechanisms of R/3, which returns a mixture of messages and numbers, and of IBM Workload Scheduler, which handles exclusively numeric return codes. By customizing the return code mapping files listed in [Return code mapping file names for r3batch on page 115](#), you can map messages from R/3 logs, spool lists, and exceptions from RFC function modules into return code values that IBM Workload Scheduler can handle.

Note that when you do not use this feature, `r3batch` does not send any return codes to IBM Workload Scheduler. In this case, IBM Workload Scheduler displays only the `r3batch` exit code, which cannot be used to set up `rcondsucc` conditions.

The return code mapping mechanism works as follows:

1. `r3batch` reads the output retrieved from the R/3 system (R/3 job log, process chain log, spool list, and so on appended to the `stdlist` of the related IBM Workload Scheduler job).
2. Following your specifications in the `rcm` files, the R/3 return messages or codes are mapped into your custom return codes and passed on to IBM Workload Scheduler.
3. These return codes are used together with the `rcondsucc` keyword set in the extended agent job definition and handled accordingly. Return code mapping is meaningful only if you use the return codes to write the expressions that determine job completion. Conversely, in the case of this extended agent, the use of `rcondsucc` is significant only if IBM Workload Scheduler gets return codes (not exit codes) from the access method.

To use the return code mapping feature:

- Leave the value of the `rcmap` option as `ON` (this is the default).
- Depending on which R/3 logs you want `r3batch` to read and map, leave the default settings of the `retrieve_joblog`, `retrieve_pchainlog`, and `retrieve_spoollist` options as `ON` and manually create the corresponding `rcm` files.
- If you want to map messages from the R/3 syslog, set the `log_r3syslog` option to `ON` and manually create the corresponding `rcm` file.

When setting up your return code mapping for `r3batch`, consider the following:

- You can define any return code numbers for your use because there are no reserved return codes for the access method or for IBM Workload Scheduler.
- Mapping files are scanned sequentially: the first match found performs the corresponding mapping. When you define a mapping file, write the most restrictive strings first.
- When you define a mapping file, remember that the R/3 log messages are read in their entirety. If you want to map only a part of the entry, you must use the wildcard characters.
- If two lines match two different patterns, then the return code is set to the higher value. In general the return code is set to the highest value among the ones yielded by the matched patterns. This is shown in the following example:

The job log returned after job PAYT410 has run is:

```
*** ERROR 778 *** EEW00778E Failed to modify the job PAYT410 with job id
***          05710310.

*** ERROR 176 *** EEW00176E Failed to add step 1.

*** ERROR 552 *** EEW00552E The R/3 job scheduling system has found an
***          error for user name * and job name PAYT410. Please check R/3
***          syslog.

*** ERROR 118 *** EEW00118E Execution terminated. Could not create and
***          start an instance of the R/3 batch job.
ERROR LEVEL=118
```

and the system log contains the following line:

```
|011:05:12|MAESTRO|SAPMSSY1|EFT|> Step 1 contains illegal values
```

The `r3batch-joblog.rcm` file contains the following matching line:

```
"118"*=100
```

while the `r3batch-syslog.rcm` file contains the following matching line:

```
"*MAESTRO*Step 1 contains illegal values "=9999
```

In this case, the return code sent back to IBM Workload Scheduler is 9999 because it is the higher of the two matching patterns.

- If no matching takes place, no return code is sent to IBM Workload Scheduler.

## Return code mapping file names for r3batch

### On UNIX operating systems

```
TWA_DATA_DIR/methods
```

### On Windows operating systems

```
TWA_home\methods
```

You can create the mapping files you want to implement in the `rcm` directory:

#### **r3batch-joblog.rcm**

Maps messages from the R/3 job log of a job into return code values. If this file is not present, the messages in the job log are ignored.

The format of the mapping file is:

```
message_text_pattern
[program_pattern[message_number_pattern[message_id_pattern]]]=RCvalue
```

where `program_pattern` is the external program that produced the output shown in the job log and `message_id_pattern` is the message class. For example, the following line appended in the job log:

```
04/26/2005 10:08:04 00
  550Step 001 started (program BTCTEST, variant VAR1, user name TWSDEV)
```

will match the following pattern line in `r3batch-joblog.rcm`:

```
"*Step*" "*" "550" "*"=5
```

because:

#### **message\_text\_pattern**

```
"Step 001 started (program BTCTEST, variant VAR1, user name TWSDEV)"
```

#### **program\_pattern**

```
"*"
```

#### **message\_number\_pattern**

```
"550"
```

#### **message\_id\_pattern**

```
"*"
```

#### **r3batch-pchainlog.rcm**

Maps messages from the protocol of a Process Chain into return code values. If this file is not present, the messages in the protocol are ignored.

The format of the mapping file is:

```
message_number_pattern
[message_id_pattern[message_variable1[message_variable2
[message_variable3[message_variable4[message_type]]]]]]]=RCvalue
```

**r3batch-spoolist.rcm**

Maps messages in the job spool list of an R/3 job into return code values. If this file is not present, the messages in the spool list are ignored.

The format of the mapping file is:

```
spool_list_row_pattern=RCvalue
```

**r3batch-syslog.rcm**

Maps messages in the syslog of an R/3 system into return code values. The R/3 system log should be checked only when R/3 returns the generic 552 error to `r3batch`.

If this file is not present, the messages in the system log are ignored.

The format of the mapping file is:

```
system_log_row_pattern=RCvalue
```

If you plan to map system log messages, be sure to set the `log_r3syslog` option of `r3batch` to ON (the default is OFF).

**r3batch-msgrc.rcm**

Maps ABAP exceptions and BAPI return codes of RFC function modules into return code values. If this file is not present, the mapping is done using a hardcoded table.

The format of the mapping file is:

```
message_number=RCvalue
```

`message_number` is the error message number. The last message number is always used. That is, if two error messages are generated, only the second one is checked against the mapping file.

## Mapping return codes for intercepted jobs

### About this task

To set up return code mapping for intercepted jobs, after defining the appropriate return code conditions in the `r3batch-joblog.rcm` file, do the following:

1. Create a customized template file named `rctemplate.jdf` in the following directory:

```
TWA_DATA_DIR/methods/r3batch_icp/
```

```
TWA_home\methods\r3batch_icp\
```

The file must contain the following:

```
alias;rccondsucc "Success Condition"
```

where, the "Success Condition" must match a condition saved in the `rcm` file.

2. Modify the `XANAME_r3batch.icp` file, located in the same path, to refer to the `jadf` file you created in the previous step as follows:

```
client job_mask user_mask rctemplate
```

IBM Workload Scheduler manages the intercepted R/3 job as a docommand job with all the options specified in the customized `jadf` file. You can check if your intercepted job is correctly submitted by reading the `job_interceptor.joblog`.

## Configuring the tracing utility

Learn how to configure the trace utility for all the access methods.

IBM Workload Scheduler logs all the processing information in the following configuration file:

```
TWA_DATA_DIR/methods/accessmethod.properties
```

```
TWA_home\methods\accessmethod.properties
```



**Note:** If you delete this file accidentally, IBM Workload Scheduler creates a new file with all the default values and contains the following comment:

```
# This file was automatically created using the default values.
```

## Customizing the .properties file

### About this task

Depending on the access method you are working with, customize the trace parameters in the following properties files:

#### **psagent.properties**

For the PeopleSoft access method.

#### **r3batch.properties, r3evmon.properties**

For the SAP access method.

With this access method, you can also specify debug and trace parameters in the single job definitions. See [Creating SAP Standard R/3 jobs from the Dynamic Workload Console on page 167](#) and [Task string to define SAP jobs on page 178](#).

#### **mvsjes.properties, mvsopc.properties**

For the z/OS access method, depending on the scheduler with which you are working.

For each .properties file you can customize the following parameters:

#### **accessmethod.trace.tracers.level**

Specify the level of tracing you want to set. Possible values are:

**DEBUG\_MIN**

Only error messages are written in the trace file. This is the default.

**DEBUG\_MID**

Informational messages and warnings are also written in the trace file.

**DEBUG\_MAX**

A most verbose debug output is written in the trace file.

The value you set in the .properties file applies to all the jobs of the corresponding access method. To specify a different trace setting for a particular job, specify the following option in the job definition:

```
-tracelvl=(1|2|3)
```

where:

- 1 = DEBUG\_MIN
- 2 = DEBUG\_MID
- 3 = DEBUG\_MAX



**Note:** When making changes to the trace level setting, the changes are effective immediately after saving the .properties file. No restart is required.

***accessmethod.trace.handlers.traceFile.fileDir***

Specifies the path where the trace file is created. Depending on the access method, the default is:

**SAP****On UNIX® operating systems**

```
TWA_DATA_DIR/methods/traces
```

**On Windows™ operating systems**

```
TWA_home\methods\traces
```

**All other access methods****On UNIX operating systems**

```
TWA_DATA_DIR/methods
```

**On Windows operating systems**

```
TWA_home\methods
```

Ensure that the new path you specify has already been created as a fully qualified path with write permissions.

Traces are written in XML format. Always use slashes (or backslashes) when you specify a new path, even if you are working on Windows™ operating systems.

The trace files give information about the method execution to the desired level of detail. The minimum trace level is always on, to guarantee a First-Failure Data Capture (FFDC) ability. The trace file name is:

**trace-psagent.log**

For the PeopleSoft access method.

**trace-r3batch.log, trace-XAname-r3evmon.log**

For the SAP access method.

**trace-mvsjes.log, trace-mvsopc.log**

For the z/OS access method. Depending on the scheduler with which you are working.

**accessmethod.trace.tracers.logging**

Specifies to enable or disable the trace utility. Possible values are:

**true**

To enable the trace utility. This is the default value.

**false**

To disable the trace utility. If you set this parameter to **false**, no traces are written in the `trace-accessmethod.log` file even if there are problems.

**r3batch.trace.handlers.traceFile.maxFiles**

The maximum number of trace files that are created before the oldest one is deleted. If this parameter is set to 1, the current trace file is never replaced and can grow without limit.

**r3batch.trace.handlers.traceFile.maxFileSize**

The maximum size (in bytes) that the trace file can reach before it is renamed and a new trace file is created. This parameter is valid only if the `r3batch.trace.handlers.traceFile.maxFiles` is set to a value greater than 1.

## Configuration file example for the SAP access method

The following `r3batch.properties` file is an example of a configuration file for the SAP access method with the following characteristics:

- The level of tracing set is `DEBUG_MID`. This means that not only error messages but also informational messages and warnings are written in the trace file.
- The trace file is created in the `/home/maestro/methods` directory.
- The tracing process creates three trace files, whose maximum size can be 10 MB.

```
r3batch.organization=ABC
r3batch.product=IWS
r3batch.component=R3BATCH
r3batch.trace.tracers.level=DEBUG_MID
r3batch.trace.tracers.listenerNames=r3batch.trace.handlers.traceFile
r3batch.trace.tracers.logging=true
r3batch.trace.handlers.traceFile.fileDir=/home/maestro/methods
r3batch.trace.handlers.traceFile.formatterName=r3batch.trace.formatter
```



```
r3batch.trace.handlers.traceFile.maxFileSize=104805100  
r3batch.trace.handlers.traceFile.maxFiles=3
```

## Part IV. Integration with SAP

The following sections give you information about IBM® Workload Scheduler for SAP, the SAP access method and job plugins, and how to schedule jobs by using the SAP Solution Manager.

IBM® Workload Scheduler is certified for the following SAP integrations:

- SAP Certified Integration with SAP NetWeaver
- SAP Certified Integration with SAP S/4HANA

Through the integrations, IBM® Workload Scheduler can access SAP BW on HANA Process Chains to handle and manage them externally and can invoke and track InfoPackages.

# Chapter 12. Introducing IBM Workload Scheduler for SAP

Improve SAP operations and enable business growth with IBM Workload Scheduler.

Use IBM Workload Scheduler for SAP, to create, schedule, and control SAP jobs using the job scheduling features of IBM Workload Scheduler. IBM Workload Scheduler supported agent workstations help extend the product scheduling capabilities to SAP through the R/3 batch access method . In addition, you can define IBM Workload Scheduler job plug-ins for SAP BusinessObjects BI and SAP PI Channel. With the SAP Solution Manager integration, you can have the IBM Workload Scheduler engine run job scheduling tasks available from the Solution Manager user interface.

IBM Workload Scheduler provides a single and simplified point of planning, control and optimization of end-to-end production services across heterogeneous IT infrastructures. It enables you to control SAP operations from z/OS indifferently.

To understand if a SAP System is compatible with IBM Workload Scheduler, check if your system exposes the following interfaces:

- BC-XBP 6.10 (V2.0) - Background Processing
- BC-XBP 7.00 (V3.0) - Background Processing
- BW-SCH 3.0 - Business Information Warehouse

For detailed information about supported SAP interfaces, prerequisite SAP notes, and supported SAP software versions, generate the [Data Integration](#) report and select the **Supported Software** tab. In addition, see the dedicated SAP section in the [IBM Workload Scheduler Detailed System Requirements](#).

## Features

[Table 24: IBM Workload Scheduler for SAP features on page 123](#) shows the tasks you can perform with IBM Workload Scheduler for SAP either in a distributed or an end-to-end environment, or both.

**Table 24. IBM Workload Scheduler for SAP features**

| Feature  | Distributed environment | End-to-end |
|--|-------------------------|------------|
| Using IBM Workload Scheduler standard job dependencies and controls on SAP jobs  | ✓                       | ✓          |
| Listing jobs, defining jobs, variants, and extended variants using the IBM Workload Scheduler interface                                    | ✓                       | ✓          |
| Defining jobs and variants dynamically at run time   | ✓                       | ✓          |
| Scheduling SAP jobs to run on specified days and times, and in a prescribed order  | ✓                       | ✓          |
| Scheduling SAP BusinessObjects Business Intelligence (BI) jobs to gain greater control over your SAP BusinessObjects Business Intelligence | ✓                       | ✓          |

**Table 24. IBM Workload Scheduler for SAP features (continued)**

| Feature   | Distributed environment   | End-to-end  |
|---|---|---|
| (BI) reports through the IBM Workload Scheduler plug-in for SAP BusinessObjects Business Intelligence (BI).   |   |   |
| Scheduling SAP Process Integration (PI) Channel jobs to control communication channels between the Process Integrator and a backend SAP R/3 system. | ✓   | ✓   |
| Scheduling and monitoring job scheduling tasks available from the SAP Solution Manager user interface.  | ✓   |   |
| Defining the national language support options  | ✓   | ✓   |
| Using the SAP Business Warehouse Support functions  | ✓   | ✓   |
| Customizing job execution return codes  | ✓   | ✓   |
| Using SAP logon groups for load balancing and fault-tolerance   | ✓   | ✓   |
| Using Business Component-eXternal Interface Background Processing (XBP 2.0 and later) interface support to:   | <ul style="list-style-type: none"> <li>• Collect intercepted jobs</li> <li>• Track child jobs</li> <li>• Keep all job attributes when you rerun a job</li> <li>• Raise events</li> </ul>  | <ul style="list-style-type: none"> <li>• Track child jobs</li> <li>• Keep all job attributes when you rerun a job</li> <li>• Raise events</li> </ul>  |
| Using Business Component-eXternal Interface Background Processing (XBP 3.0) interface support to:   | <ul style="list-style-type: none"> <li>• Create criteria profiles to log raised events, reorganize the event history, and intercept and relaunch jobs, according to the criteria you specify.</li> <li>• SAP application log and application return code</li> </ul> | <ul style="list-style-type: none"> <li>• Create criteria profiles to log raised events, reorganize the event history, and intercept and relaunch jobs, according to the criteria you specify.</li> <li>• SAP application log and application return code</li> </ul> |

**Table 24. IBM Workload Scheduler for SAP features (continued)**

| Feature   | Distributed environment  | End-to-end   |
|---|--|--|
|   | <ul style="list-style-type: none"> <li>• Spool list request and display for jobs that have run.</li> <li>• Temporary variants</li> </ul> | <ul style="list-style-type: none"> <li>• Spool list request and display for jobs that have run.</li> <li>• Temporary variants</li> </ul> |
| Assigning an SAP job to a server group, for batch processing  | ✓  | ✓  |
| Exporting SAP factory calendars and adding their definitions to the IBM Workload Scheduler database               | ✓  |  |
| Defining internetwork dependencies and event rules for IBM Workload Scheduler based on SAP events                 | ✓  |  |
| Defining event rules based on IDoc records  | ✓  |  |
| Defining event rules based on CCMS Monitoring Architecture alerts   | ✓  |  |
| Rerunning a job that submits a process chain from a specific process, from failed processes, or as a new instance | ✓  | ✓  |
| Displaying the details of a job that submits a process chain  | ✓  | ✓  |
| Enabling job throttling   | ✓  | ✓  |

## Chapter 13. Access method for SAP

The SAP R/3 batch access method enables communication between an external SAP R/3 system and IBM Workload Scheduler and provides a single point of entry for automating the launching of jobs, monitoring the status of jobs and managing exceptions and recovery.

Using the SAP access method you can run and monitor SAP jobs from the IBM Workload Scheduler environment. These jobs can be run as part of a schedule or submitted for ad-hoc job processing. SAP extended agent or dynamic agent jobs can have all of the same dependencies and recovery options as other IBM Workload Scheduler jobs. SAP jobs must be defined in IBM Workload Scheduler to be run and managed in the IBM Workload Scheduler environment.

IBM Workload Scheduler provides a single and simplified point of planning, control and optimization of end-to-end production services across heterogeneous IT infrastructures. It enables you to control SAP operations from z/OS indifferently.

### Scheduling process for the agent workstation hosting the r3batch access method

IBM Workload Scheduler launches jobs in SAP using IBM Workload Scheduler jobs defined to run on a supported agent workstation.

Supported agent workstations include:

- dynamic agents
- extended agents
- IBM Z Workload Scheduler Agents

See [Supported agent workstations on page 16](#) for more details about these agent workstations.

The supported agent workstations use the access method, `r3batch`, to pass SAP job-specific information to predefined SAP instances. The access method uses information provided in an options file to connect and launch jobs on an SAP instance.

Multiple extended agent workstations can be defined to use the same host, by using multiple options files. Using the SAP extended agent workstation unique identifier as a key, `r3batch` uses the corresponding options file to determine which instance of SAP will run the job. See [UNIQUE\\_ID on page 49](#) for more information about identifying the extended agent workstation unique identifier. It makes a copy of a template job in SAP and marks the job as "scheduled". It then monitors the job through to completion, writing job progress and status information to a job standard list on the host workstation.

On dynamic agent workstations, more than one options file can be associated to the workstation.

For more information about job management, refer to the *IBM Workload Scheduler: User's Guide and Reference*.

For more detailed information about configuration files on extended agents and dynamic agents, see [Configuring the SAP access method on page 142](#).

## Roles and responsibilities

In a typical enterprise, different users contribute to the implementation and operation of the product. [Table 25: Roles and responsibilities in IBM Workload Scheduler for SAP on page 127](#) describes the roles and responsibilities of all users in the process model, showing the tasks they perform.

**Table 25. Roles and responsibilities in IBM Workload Scheduler for SAP**

| User role                            | User task   |
|--------------------------------------|---|
| IBM Workload Scheduler administrator | <ul style="list-style-type: none"> <li>• <a href="#">Creating the IBM Workload Scheduler RFC user on page 130</a></li> <li>• <a href="#">Creating the authorization profile for the IBM Workload Scheduler user on page 130</a></li> <li>• <a href="#">Copying the correction and transport files on page 133</a></li> <li>• <a href="#">Importing ABAP/4 function modules into SAP on page 134</a></li> </ul>  |
| IBM Workload Scheduler configurator  | <ul style="list-style-type: none"> <li>• <a href="#">Changing the IBM Workload Scheduler RFC user ID password on page 138</a></li> <li>• <a href="#">Migrating from previous versions on page 142</a></li> <li>• <a href="#">Print parameter and job class issues on page 140</a></li> <li>• <a href="#">Defining the configuration options on page 144</a></li> <li>• <a href="#">Connecting to the SAP system on page 164</a></li> <li>• <a href="#">Creating SAP Standard R/3 jobs from the Dynamic Workload Console on page 167</a></li> <li>• <a href="#">Using the BDC Wait option on page 218</a></li> <li>• <a href="#">Implementing job interception on page 220</a></li> <li>• <a href="#">Defining user authorizations to manage SAP Business Warehouse InfoPackages and process chains on page 230</a></li> <li>• <a href="#">Setting and using job throttling on page 247</a></li> <li>• <a href="#">Exporting SAP factory calendars on page 252</a></li> <li>• <a href="#">Setting National Language support options on page 287</a></li> </ul> |
| IBM Workload Scheduler developer     | <ul style="list-style-type: none"> <li>• <a href="#">Editing a standard SAP job on page 177</a></li> <li>• <a href="#">Task string to define SAP jobs on page 178</a></li> <li>• <a href="#">Displaying details about a standard SAP job on page 189</a></li> <li>• <a href="#">Verifying the status of a standard SAP job on page 189</a></li> <li>• <a href="#">Deleting a standard SAP job from the SAP database on page 190</a></li> <li>• <a href="#">Balancing SAP workload using server groups on page 191</a></li> <li>• <a href="#">Defining SAP jobs dynamically on page 197</a></li> </ul>   |

**Table 25. Roles and responsibilities in IBM Workload Scheduler for SAP (continued)**

| User role                        | User task  |
|----------------------------------|--|
| IBM Workload Scheduler developer | <ul style="list-style-type: none"> <li>• <a href="#">Managing SAP Business Warehouse InfoPackages and process chains on page 231</a></li> <li>• Defining an IBM Workload Scheduler job that runs an SAP PI Channel job</li> <li>• See the section about prerequisite steps to create SAP BusinessObjects BI in <i>User's Guide and Reference</i>.</li> </ul><br><ul style="list-style-type: none"> <li>• <a href="#">Defining internetwork dependencies and event rules based on SAP background events on page 255</a></li> <li>• <a href="#">Defining event rules based on IDoc records on page 264</a></li> <li>• <a href="#">Defining event rules based on CCMS Monitoring Architecture alerts on page 274</a></li> </ul> |
| IBM Workload Scheduler operator  | <ul style="list-style-type: none"> <li>• <a href="#">Rerunning a standard SAP job on page 195</a></li> <li>• <a href="#">Mapping between IBM Workload Scheduler and SAP job states on page 191</a></li> <li>• <a href="#">Raising an SAP event on page 193</a></li> <li>• <a href="#">Killing an SAP job instance on page 193</a></li> <li>• <a href="#">Displaying details about a process chain job on page 237</a></li> </ul>   |

## Configuring user authorization (Security file)

IBM Workload Scheduler manages security through the use of a configuration file, the security file. In the security file, you specify which scheduling objects a user can manage and how. You define these settings by writing user definitions. A user definition is an association between a name and a set of users, the objects they can access, and the actions they can perform on the specified objects.

For more detailed information about the security file, security file syntax, and how to configure the security file, see "Configuring user authorization (Security file)" in the *Administration Guide*.

The following table displays the access keywords required to grant authorization to access and work with SAP scheduling objects assigned to IBM Workload Scheduler users.



**Table 26. Access keywords for activities with SAP scheduling objects**

|                          | <b>Activity</b>  | <b>Access keywords required</b>    |
|--------------------------|--|------------------------------------|
| Dynamic Workload Console | Define or search for SAP jobs on an extended agent workstation.                      | display on the workstation         |
|                          | Retrieve the spool list on an extended agent workstation.                            | display on the workstation         |
|                          | Rerun from a step on an extended agent.  | rerun on the job                   |
|                          | Define or search for SAP jobs on a dynamic agent workstation, pool, or dynamic pool. | display and run on the workstation |
|                          | Retrieve the spool list on a dynamic agent workstation, pool, or dynamic pool.       | display and run on the job         |
|                          | Rerun from a step on a dynamic agent workstation, pool, or dynamic pool.             | rerun on the job                   |

## Configuring the SAP environment

You must configure the SAP environment before using the SAP access method.

To communicate and manage the running of jobs on SAP systems using the access method for SAP, complete the following configuration steps in the SAP environment.

The steps require that you have knowledge of an SAP Basis Administrator.

## Overview

### About this task

Here is an overview of the customization procedure:

1. Create a new user ID for RFC communications in SAP for IBM Workload Scheduler.
2. Create the authorization profile as described in [Creating the authorization profile for the IBM Workload Scheduler user on page 130](#).
3. Copy the correction and transport files from the IBM Workload Scheduler server to the SAP server.
4. Import the correction and transport files into SAP and verify the installation.

## Results



## Creating the IBM Workload Scheduler RFC user

### About this task

For IBM Workload Scheduler to communicate with SAP, you must create a user ID in SAP for IBM Workload Scheduler batch processing. For security reasons, use a new user ID rather than an existing one.

1. Create a new RFC user ID.
2. Give this new RFC user ID the following attributes:
  - A user type of **CPIC**, **Communications**, or **DIALOG**, depending on the SAP release.
  - A password at least six characters in length. IBM Workload Scheduler requires this password to start or monitor SAP jobs. If this password changes in SAP, you must update the options file used by `r3batch` with the new password.
  - The appropriate security profiles, depending on your version of SAP.

## Creating the authorization profile for the IBM Workload Scheduler user

The two ways to create the authorization profile for the IBM Workload Scheduler user.

There are two alternative ways to perform this task:

- Using transaction `SU02` and manually creating the profile.
- Using the Profile Generator (transaction `PFCG`).

## Using transaction su02 and manually creating the profile

### About this task

Perform the following steps:

1. Write a profile name, for example `Z_TWS`, and a description.
2. Manually add the authorizations according to the following table:

| Object     | Description                                     | Authorization |
|------------|---|---------------|
| S_ADMI_FCD | System authorizations                           | S_ADMI_ALL    |
| S_APPL_LOG | Application logs                                | S_APPL_L_E2E  |
| S_BTCH_ADM | Background processing: Background administrator | S_BTCH_ADM    |

| Object     | Description   | Authorization |
|------------|---|---------------|
| S_BTCH_JOB | Background processing: Operations on background jobs              | S_BTCH_ALL    |
| S_BTCH_NAM | Background processing: Background user name                       | S_BTCH_ALL    |
| S_DEVELOP  | ABAP Workbench: full authorization to modify objects of type PROG | E_ABAP_ALL    |
| S_LOG_COM  | Authorization to run external commands                            | S_LOGCOM_ALL  |
| S_PROGRAM  | ABAP: program run checks  | S_ABAP_ALL    |
| S_RFC      | Authoritation. check for RFC access                               | S_RFC_ALL     |
| S_RZL_ADM  | CCMS: System Administration                                       | S_RZL_ALL     |
| S_SPO_ACT  | Spool: Actions  | S_SPO_ALL     |
| S_SPO_DEV  | Spool: Device authorizations                                      | S_SPO_DEV_AL  |
| S_XMI_LOG  | Internal access authorizations for XMI log                        | S_XMILOG_ADM  |
| S_XMI_PROD | Authorization for external management interfaces (XMI)            | S_XMI_ADMIN   |

The authorizations are located in the "Basis: Administration" object class.

Depending on the version of SAP, the authorization S\_RFC\_ALL are located either in the "Cross-application Authorization Objects" or in the "Non-application-specific Authorization Objects" object class.

3. Save the profile.
4. Go to the user maintenance panel and assign the profile to the IBM Workload Scheduler SAP user.
5. Save the user data.

## Using transaction PFCG (Profile Generator)

### About this task

Perform the following steps:

1. Write a name, for example ZTWS, in **Role Name**.
2. Click **Create Role** and write a description for the role, such as "Role for the TWS user."
3. Save the role.
4. Select **Authorizations**.
5. Click **Change Authorization Data**.

6. In the pop-up, select **Templates**.

7. Manually add the following authorization objects:

| Object     | Description   |
|------------|---|
| S_ADMI_FCD | System authorizations   |
| S_APPL_LOG | Application logs  |
| S_BTCH_ADM | Background processing: Background administrator                   |
| S_BTCH_JOB | Background processing: Operations on background jobs              |
| S_BTCH_NAM | Background processing: Background user name                       |
| S_PROGRAM  | ABAP: Program run checks  |
| S_DEVELOP  | ABAP Workbench: full authorization to modify objects of type PROG |
| S_LOG_COM  | Authorization to run external commands                            |
| S_RFC      | Authorization check for RFC access                                |
| S_RZL_ADM  | CCMS: System Administration                                       |
| S_SPO_ACT  | Spool: Actions  |
| S_SPO_DEV  | Spool: Device authorizations                                      |
| S_XMI_LOG  | Internal access authorizations for XMI log                        |
| S_XMI_PROD | Authorization for external management interfaces (XMI)            |

8. Fill in the values according to the following scheme:

| Object     | Description  |
|------------|--|
| S_ADMI_FCD | System authorizations <ul style="list-style-type: none"> <li>◦ System administration function: Full authorization</li> </ul>   |
| S_APPL_LOG | Activity: Display <ul style="list-style-type: none"> <li>◦ Application log Object name: Full authorization</li> <li>◦ Application log subobject: Full authorization</li> </ul>                         |
| S_BTCH_ADM | Background processing: Background administrator <ul style="list-style-type: none"> <li>◦ Background administrator ID: Full authorization</li> </ul>  |
| S_BTCH_JOB | Background processing: Operations on background jobs <ul style="list-style-type: none"> <li>◦ Job operations: Full authorization</li> <li>◦ Summary of jobs for a group: Full authorization</li> </ul> |
| S_BTCH_NAM | Background processing: Background user name  |

| Object     | Description  |
|------------|--|
|            | <ul style="list-style-type: none"> <li>◦ Background user name for authorization check: Full authorization</li> </ul>   |
| S_PROGRAM  | ABAP: Program run checks <ul style="list-style-type: none"> <li>◦ User action ABAP/4 program: Full authorization</li> <li>◦ Authorization group ABAP/4 program: Full authorization</li> </ul>  |
| S_RFC      | Authorization check for RFC access <ul style="list-style-type: none"> <li>◦ Activity: Full authorization</li> <li>◦ Name of RFC to be protected: Full authorization</li> <li>◦ Type of RFC object to be protected: Full authorization</li> </ul> |
| S_RZL_ADM  | Activity: Full authorization   |
| S_SPO_ACT  | Spool: Actions <ul style="list-style-type: none"> <li>◦ Authorization field for spool actions: Full authorization</li> <li>◦ Value for authorization check: Full authorization</li> </ul>  |
| S_SPO_DEV  | Spool: Device authorizations <ul style="list-style-type: none"> <li>◦ Spool - Long device names: Full authorization</li> </ul>   |
| S_XMI_LOG  | Internal access authorizations for XMI log <ul style="list-style-type: none"> <li>◦ Access method for XMI log: Full authorization</li> </ul>   |
| S_XMI_PROD | Authorization for external management interfaces (XMI) <ul style="list-style-type: none"> <li>◦ XMI logging - Company name: ABC*</li> <li>◦ XMI logging - Program name: MAESTRO*</li> <li>◦ Interface ID: Full authorization</li> </ul>          |

9. Save the authorizations.
10. Generate a profile. Use the same name that you wrote in **Role Name**.
11. Exit the authorization management panel and select **User**.
12. Add the IBM Workload Scheduler user to the role.
13. Save the role.

## Copying the correction and transport files

### About this task

The setup file loads four correction and transport files into the IBM Workload Scheduler home directory. Copy these correction and transport files to the SAP server and import them into the SAP database, as follows:

1. On your SAP database server, log on to the SAP system as an administrator.
2. Copy the control file and data file from the `methods` directory and to the following directories on your SAP database server:

```
copy control_file /usr/sap/trans/cofiles/
copy data_file /usr/sap/trans/data/
```

The names of `control_file` and `data_file` vary from release to release. The files are located in the `methods` directory: UNIX®: `TWA_DATA_DIR\methods`, Windows™: `TWA_home\methods`, and have the following file names and format:

**For SAP releases earlier than 6.10:**

- `K000xxx.TV1` (control file) and `R000xxx.TV1` (data file)
- `K900xxx.TV2` (control file) and `R900xxx.TV2` (data file)

**For SAP releases 6.10, or later:**

- `K9000xx.TV1` (control file) and `R9000xx.TV1` (data file)
- `K9007xx.TV1` (control file) and `R9007xx.TV1` (data file)

where `x` is a digit generated by the SAP system.

Specifically, for IBM Workload Scheduler version 9.5 the following files are used:

**For SAP releases earlier than 6.10:**

- `K000538.TV1` (for standard jobs scheduling)
- `R000538.TV1` (for standard jobs scheduling)
- `K900294.TV2` (for IDoc monitoring and job throttling)
- `R900294.TV2` (for IDoc monitoring and job throttling)

**For SAP releases 6.10, or later:**

- `K900044.TV1` (for standard jobs scheduling)
- `R900044.TV1` (for standard jobs scheduling)
- `K900751.TV1` (for IDoc monitoring and job throttling)
- `R900751.TV1` (for IDoc monitoring and job throttling)

## Importing ABAP/4 function modules into SAP

How to generate, activate and commit new ABAP/4 modules to a SAP system.

### About this task

This section describes the procedure to generate, activate, and commit new ABAP/4 function modules to your SAP system and several new internal tables. You do not modify any existing SAP system objects. For information about the supported SAP R/3 releases, see the System Requirements Document at [Download Documents, System Requirements, Release Notes](#).

The number of ABAP/4 modules that you install with the import process varies from release to release. The modules are installed in the `methods` directory and have the following file names and format:

- `K9000xx.TV1` (function modules for standard jobs scheduling extensions)
- `K9007xx.TV1` (function modules for IDoc monitoring and job throttling)

where *x* is a digit generated by the SAP system. The methods directory is located in:

#### On UNIX operating systems

```
TWA_DATA_DIR/methods
```

#### On Windows operating systems

```
TWA_home\methods
```

Before importing the ABAP/4 function modules, review the considerations documented in [Migrating from previous versions on page 142](#).

To import ABAP/4 function modules into SAP:

1. Change to the following directory:

```
cd /usr/sap/trans/bin
```

2. Add the transport file to the buffer:

```
tp addtobuffer transport sid
```

where:

#### **transport**

The transport request file.

#### **sid**

The SAP system ID.

For example, if the transport file in the `TWA_home\methods` directory is named `K9000xxx.TV1`, the transport request is `tv1K9000xxx`.

3. Run the **tp tst** command to test the import:

```
tp tst transport sid
```

After running this command, examine the log files in the `/user/sap/trans/log` directory for error messages. Warnings of severity level 4 are normal.

If there are errors, check with a person experienced in correction and transport, or try using unconditional modes to do the import.

4. Run the following command to import all the files in the buffer:

```
tp import transport sid
```

This command generates the new ABAP/4 modules and commits them to the SAP database. They automatically become active.

After running this command, examine the log files located in the `/user/sap/trans/log` directory for error messages. Warnings of severity level 4 are normal.

If a problem is encountered, use unconditional mode when running this step:

```
tp import transport sid U126
```

- When the import is complete, check the log files located in the `/usr/sap/trans/log` directory to verify that the ABAP/4 modules were imported successfully.

If you apply the standard transport and the IDOC transport, 26 ABAP/4 modules are installed by the import process. For a list of the transport files to be used, refer to [Importing ABAP/4 function modules into SAP on page 134](#). [Table 27: ABAP/4 modules installed on page 136](#) lists the ABAP modules installed.

**Table 27. ABAP/4 modules installed**

| ABAP/4 module                  | Installed? |
|--------------------------------|------------|
| ENQUEUE_/IBMTWS/EQ_XAPPL       | ✓          |
| DEQUEUE_/IBMTWS/EQ_XAPPL       | ✓          |
| /IBMTWS/UNREGISTER_XAPPL       | ✓          |
| /IBMTWS/GET_XAPPL_REGISTRATION | ✓          |
| /IBMTWS/MODIFY_JOB_CLASS       | ✓          |
| /IBMTWS/REGISTER_XAPPL         | ✓          |
| J_101_BDC_STATUS               | ✓          |
| J_101_DATE_TIME                | ✓          |
| J_101_IDOC_SELECT              | ✓          |
| J_101_JOB_ADJUST_CLIENT        | ✓          |
| J_101_JOB_FIND                 | ✓          |
| J_101_JOB_FINDALL              | ✓          |
| J_101_JOB_HAS_EXTENDED_VARIANT | ✓          |
| J_101_JOB_LOG                  | ✓          |
| J_101_RAISE_EVENT              | ✓          |
| J_101_REPORT_ALL_SELECTIONS    | ✓          |
| J_101_REPORT_GET_TEXTPOOL      | ✓          |
| J_101_VARIANT_COPY             | ✓          |
| J_101_VARIANT_CREATE           | ✓          |
| J_101_VARIANT_DELETE           | ✓          |



| ABAP/4 module                  | Installed? |
|--------------------------------|------------|
| J_101_VARIANT_EXISTS           | ✓          |
| J_101_VARIANT_GET_DEFINITION   | ✓          |
| J_101_VARIANT_GET_HELP_VALUES  | ✓          |
| J_101_VARIANT_MAINTAIN_CNT_TBL | ✓          |
| J_101_VARIANT_MAINTAIN_SEL_TBL | ✓          |
| J_101_VARIANT_MODIFY           | ✓          |

Table 28: ABAP/4 modules contents on page 137 shows the contents of the ABAP modules for the IDoc records and job throttling feature.

**Table 28. ABAP/4 modules contents**

| Object                         | Description   | Used by...                         |
|--------------------------------|---|------------------------------------|
| /IBMTWS/                       | Type = Development Namespace. For IBM Workload Scheduler.   | Internal use only                  |
| /IBMTWS/EQ_XAPPL               | Type = Lock Object. Synchronizes the job throttler instances and job interception collector jobs that are running against the same SAP system.  | Job throttling<br>Job interception |
| /IBMTWS/GET_XAPPL_REGISTRATION | Type = Function Module. It is used to query for existing external application registration data in table IBMTWS/XAPPL, for example the registration data of a job throttler instance or job interception collector. | Job throttling<br>Job interception |
| /IBMTWS/MODIFY_JOB_CLASS       | Type = Function Module. Modifies the job class of an intercepted job that is controlled by the job throttler. For details, see <a href="#">Step 3. Enabling job class inheritance on page 248</a> .                 | Job throttling<br>Job interception |
| /IBMTWS/REGISTER_XAPPL         | Type = Function Module. Registers an external application, for example the job throttler.   | Job throttling<br>Job interception |
| /IBMTWS/TWS4APPS               | Type = Function group. For IBM Workload Scheduler.  | Internal use only                  |
| /IBMTWS/UNREGISTER_XAPPL       | Type = Function Module. Unregisters an external application, for example the job throttler.   | Job throttling<br>Job interception |
| /IBMTWS/XAPPL                  | Type = Table. Stores the registration data of external applications. An external application can  | Job throttling<br>Job interception |

| Object                    | Description  | Used by...                           |
|---------------------------|--|--------------------------------------|
|                           | be a job throttler instance or a job interception collector.   |                                      |
| J_101_IDOC_SELECT         | Type = Function Module. Selects IDoc records from SAP internal tables. For details, see <a href="#">Defining event rules based on IDoc records on page 264</a> . | IDoc event rules                     |
| J_101_TWS_EDIDC           | Type = Data structure in FM interface  | Function module<br>J_101_IDOC_SELECT |
| J_101_TWS_IDOC_SELECTION  | Type = Data structure in FM interface  | Function module<br>J_101_IDOC_SELECT |
| J_101_TWS_STATE_SELECTION | Type = Data structure in FM interface  | Function module<br>J_101_IDOC_SELECT |

To uninstall the transport you can use the STMS transaction see: [Deleting Imported Requests from the Import Queue](#).

## Changing the IBM Workload Scheduler RFC user ID password

### About this task

If the password of the IBM Workload Scheduler RFC user ID is modified after the initial installation, the options file used by `r3batch` must be updated with this change.

In UNIX®, log on as root to the system where IBM Workload Scheduler is installed.

In Windows™, log on as an administrator and start a DOS shell on the system where IBM Workload Scheduler is installed.

1. Generate an encrypted version of the new password using the **enigma** command located in the following directory: in `TWS_home/methods`.

#### On UNIX operating systems

`TWA_DATA_DIR/methods`

#### On Windows operating systems

`TWA_home\methods`

To do this in a command shell, type:

```
enigmanewpwd
```

where *newpwd* is the new password for the IBM Workload Scheduler RFC user ID.

The **enigma** command prints an encrypted version of the password.

2. Copy the encrypted password into the options file, which is located in the following directory:

**On UNIX operating systems**

```
TWA_DATA_DIR/methods
```

**On Windows operating systems**

```
TWA_home\methods
```

The file can be edited with any text editor.

**Results**

Ensure that you copy the password exactly, preserving uppercase, lowercase, and punctuation. The encrypted password looks similar to:

```
{3des}Hchwu6IsF5o=
```

If the encrypted password is not entered correctly, IBM Workload Scheduler is unable to start or monitor SAP batch jobs.

**Securing data communication**

You can increase the security of your SAP system through the use of an external security product. Secure Network Communications (SNC) can integrate the external security product with the SAP system.

Data communication paths between the client and server components of the SAP system that use the SAP protocols RFC or DIAG are more secure with SNC. The security is strengthened through the use of additional security functions provided by an external product that are otherwise not available with SAP systems.

SNC provides security at application level and also end-to-end security. IBM® Workload Scheduler is extended to read SNC configuration parameters and forward them to the SAP RFC communication layer used when logging in to the SAP system. IBM® Workload Scheduler does not provide or ship SNC software but instead enables the use of third-party SNC products to secure the RFC communication.

**Levels of protection**

You can apply one of the following levels of protection:

**Authentication only**

This is the minimum level of security protection available with SNC. The system verifies the identity of the communication partners.

**Integrity protection**

The system detects any changes to the data which might have occurred between the two components communicating.

**Privacy protection**

This is the maximum level of security protection available with SNC. The system encrypts the messages being transferred so that any attempt to eavesdrop is useless. Privacy protection also includes integrity protection of the data.

## Example

The following options in the local options file are used to configure SNC for IBM Workload Scheduler:

- **r3snclib**: the path and file name of the SNC library.
- **r3sncmode**: enables or disables SNC between r3batch and the SAP R3 system.
- **r3sncmyname**: the name of the user sending the RFC for SNC.
- **r3sncpartnername**: the SNC name of the SAP R3 communication partner (application server).
- **r3sncqop**: the SNC protection level.

See [Defining the local options on page 147](#) for a description of these options in the local options file.

## Print parameter and job class issues

The workstation running the r3batch access method for SAP uses the official RFC interfaces of SAP for job scheduling. When you migrate from previous versions of SAP, there can be problems with print parameters in jobs launched by IBM Workload Scheduler. This is because of limitations in the RFC interfaces.

These limitations are no longer true with XBP 2.0 and later.

The following is a list of print parameters supported by BAPI XBP 1.0 for SAP release 4.6x and later:

- archiving mode
- authorization
- columns
- delete after output
- lines
- number of copies
- output device
- print immediately
- recipient
- sap cover page
- selection cover page
- spool retention period

To resolve the loss of print parameters when copying a job, install the appropriate SAP Support Package as stated in the SAP notes 399449 and 430087.

The same applies to the job class. Official SAP interfaces only allow class C jobs. Installing the SAP Support Package also resolves this issue.

## Unicode support

Access method for SAP supports the Unicode standard.

## What is Unicode

Unicode was devised to address the problem caused by the profusion of code sets. Since the early days of computer programming hundreds of encodings have been developed, each for small groups of languages and special purposes. As a result, the interpretation of text, input, sorting, display, and storage depends on the knowledge of all the different types of character sets and their encodings. Programs are written to either handle one single encoding at a time and switch between them, or to convert between external and internal encodings.

The problem is that there is no single, authoritative source of precise definitions of many of the encodings and their names. Transferring text from one computer to another often causes some loss of information. Also, if a program has the code and the data to perform conversion between many subsets of traditional encodings, then it needs to hold several Megabytes of data.

Unicode provides a single character set that covers the languages of the world, and a small number of machine-friendly encoding forms and schemes to fit the needs of existing applications and protocols. It is designed for best interoperability with both ASCII and ISO-8859-1, the most widely used character sets, to make it easier for Unicode to be used in applications and protocols.

Unicode makes it possible to access and manipulate characters by unique numbers, their Unicode code points, and use older encodings only for input and output, if at all. The most widely used forms of Unicode are:

- UTF-32, with 32-bit code units, each storing a single code point. It is the most appropriate for encoding single characters.
- UTF-16, with one or two 16-bit code units for each code point. It is the default encoding for Unicode.
- UTF-8, with one to four 8-bit code units (bytes) for each code point. It is used mainly as a direct replacement for older MBCS (multiple byte character set) encodings.

## Unicode support on SAP

Starting with SAP version 4.7 (R/3 Enterprise), Unicode is used on all layers of the SAP system:

- UTF-8, UTF-16, and UTF-32 on the database
- UTF-16 on the application server and graphical user interface

`r3batch` uses the UTF-8 code page internally. Because it communicates with SAP at the application server layer, it uses UTF-16 when communicating with Unicode-enabled SAP systems.

To use Unicode support, the following conditions must be met:

- Access method for SAP must run on a supported operating system. See the SAP support section in the [IBM Workload Scheduler Detailed System Requirements](#). The product does not support Unicode on the other operating systems where it can be installed.
- The SAP systems that communicate with `r3batch` must be running Unicode-enabled SAP versions.

If these conditions are not met, you cannot use Unicode support and must make sure that `r3batch`, the Dynamic Workload Console, and the target SAP system code page settings are aligned. Use the options related to national language support described in [SAP supported code pages on page 288](#).

## Migrating from previous versions

This version of IBM Workload Scheduler for SAP supports all the SAP versions listed in [IBM Workload Scheduler Detailed System Requirements](#). The IBM Workload Scheduler access method for SAP uses the official SAP RFC interfaces for job scheduling. These are:

- The BC-XBP 6.10 (V2.0) Interface function modules for SAP versions 6.10 and later.
- The BC-XBP 7.00 (V3.0) Interface function modules for SAP versions 7.00, Support Package 16, in addition to the BC-XBP 6.10 (V2.0) function modules.

To avoid conflicts with other vendors, the IBM Workload Scheduler ABAP modules now belong to the IBM Workload Scheduler partner namespace `J_101_xxx` and `/IBMTWS`. After you have completed the imports as described in [Importing ABAP/4 function modules into SAP on page 134](#), the RFC `J_101_xxx` function modules and the `/IBMTWS` function modules are installed on your system.

If you had a previous installation of IBM Workload Scheduler extended agent for SAP on your system, you can delete the following function modules from your SAP system:

```
Z_MAE2_BDC_STATUS
Z_MAE2_DATE_TIME
Z_MAE2_JOB_COPY
Z_MAE2_JOB_DELETE
Z_MAE2_JOB_FIND
Z_MAE2_JOB_FINDALL
Z_MAE2_JOB_LOG
Z_MAE2_JOB_OPEN
Z_MAE2_JOB_START
Z_MAE2_JOB_STATUS
Z_MAE2_JOB_STOP
```

These are old versions of the ABAP functions, which belong to the customer name space. You can also delete the function group `YMA3`. It is not necessary to delete the function modules and the function group, but delete them if you want to clean up your system.

To upgrade SAP, perform the following steps:

1. Uninstall the IBM® Workload Scheduler ABAP module.
2. Upgrade SAP.
3. Install the IBM® Workload Scheduler ABAP module.

## Configuring the SAP access method

This section provides detailed information about the SAP options file creation.

The files for the SAP access method are located in the following path:

## On UNIX operating systems

`TWA_DATA_DIR/methods`

## On Windows operating systems

`TWA_home\methods`

If `r3batch` finds the local configuration file for an extended agent or dynamic agent, it ignores the duplicate information contained in `r3batch.opts`. If instead it does not find a local configuration file then it will use `r3batch.opts` global options file.

To successfully use the SAP access method, you must first install the SAP RFC libraries, as described in the System Requirements Document in the SAP Access Method Requirements section.

## Dynamic agents

### `r3batch.opts`

A common configuration file for the `r3batch` access method, whose settings affect all the `r3batch` instances. It functions as a “global” configuration file.

### `DYNAMIC_AGENT_FILE_r3batch.opts`

One or more configuration files that are specific to each dynamic agent workstation within a particular installation of a `r3batch` access method. The `DYNAMIC_AGENT_FILE_r3batch.opts` is the name of the options file, where `DYNAMIC_AGENT` is not necessarily the name of the dynamic agent workstation, because the dynamic agent can have more than one `.opts` file associated. If you do not create a local options file, the global options file is used. Every dynamic agent workstation must have one or more local options file with its own configuration options.



**Note:** The value for `DYNAMIC_AGENT` must be written in uppercase alphanumeric characters. Double-byte character set (DBCS), Single-byte character set (SBCS), and Bidirectional text are not supported.



**Note:** If you have a **pool** or **dynamic pool** containing  $n$  agents, you must create an options file for the dynamic pool and copy it in the `TWA_home/methods` of each agent of the pool so that all members of the pool have a local options file with the same name. Then you must create another options file for the specific agent in the same directory.

For example, if the SAP access method is installed for `AGENT1` and `AGENT2` that belong to the dynamic pool ***DYN\_POOL***, you need to create the following options files in the path `TWA_home/methods` on each agent:

### **AGENT 1**

- `FILE_AGENT1_r3batch.opts`
- `FILE_DYN_POOL_r3batch.opts`

## AGENT2

- `FILE_AGENT2_r3batch.opts`
- `FILE_DYN_POOL_r3batch.opts`

On dynamic workstations, you can create a new options file or edit an existing options files from an Option Editor, a graphical user interface panel available on the General tab of the SAP job definition panels in the Dynamic Workload Console.

### Extended agents

#### `r3batch.opts`

A common configuration file for the `r3batch` access method, whose settings affect all the `r3batch` instances. It functions as a “global” configuration file.

#### `XA_Unique_ID_r3batch.opts`

A configuration file that is specific to each IBM Workload Scheduler extended agent workstation that uses the `r3batch` access method. Its options affect only the `r3batch` instance that is used by that particular workstation. It functions as a “local” configuration file.



**Note:** `XA_Unique_ID` is the unique identifier for the extended agent workstation. See [UNIQUE\\_ID on page 49](#) for more details about identifying the unique identifier for an extended agent workstation.

For example, to define two extended agent workstations with unique identifiers, `07756YBX76Z6AFX2` and `S4HANAR3BW`, that access two SAP systems, `SAP1` and `SAP2`, with the `r3batch` access method, you must define the following three configuration files:

- Global `r3batch.opts`
- Local file `07756YBX76Z6AFX2_r3batch.opts`
- Local file `S4HANAR3BW_r3batch.opts`

## Defining the configuration options

This section describes the options you can configure in `r3batch.opts` and in `XANAME_r3batch.opts`.

## Defining the global options

[Table 29: r3batch global configuration options on page 145](#) lists the options that can be specified only in the *global* configuration file `r3batch.opts`.



Table 29. r3batch global configuration options

| Option  | Description  | Default |
|---|--|---------|
| <b>dep_sem_proj</b>                             | (Optional) The project ID for the external dependency semaphore used for handling SAP background processing events as external follows dependencies.   | d       |
| <b>icp_sem_proj</b>                             | (Optional) The project ID for the job interception semaphore.  | c       |
| <b>job_sem_proj</b>                             | (Optional) The project ID for the job semaphore.   | a       |
| <b>max_jobs_to_release_for_user</b>             | Defines the maximum number of jobs released for each user each time the release job is submitted. If this option is less than or equal to 0, the option is ignored and all jobs are released when the release job is submitted. This option is present both in global and local options. If you define it in both configuration files, the local value overrides the global one.   | ON      |
| <b>primm_enable</b>                             | (Optional) Enables (ON) the SAP print parameter PRIMM (Print Immediately) for all jobs.  | OFF     |
| <b>prnew_enable</b>                             | (Optional) Enables (ON) the SAP print parameter PRNEW (New Spool Request) for all jobs.  | OFF     |
| <b>prrel_enable</b>                             | (Optional) Enables (ON) the SAP print parameter PRREL (Immediately delete the spool output after printing) for all jobs.   | OFF     |
| <b>prsap_enable</b>                             | (Optional) Enables (ON) the SAP print parameter PRSAP (Print SAP Cover Page) for all jobs. The default value is OFF.   | OFF     |
| <b>prunx_enable</b>                             | (Optional) Enables (ON) the SAP print parameter PRUNX (Print Operating System Cover Page) for all jobs.  | OFF     |
| <b>release_all_intercepted_jobs_for_request</b> | <p>Releases jobs for each user on a cyclic basis, based on the number of jobs specified in the <b>max_jobs_to_release_for_user</b> option. The default value is <b>ON</b>, which means that all jobs are submitted for each user:</p> <ul style="list-style-type: none"> <li>• If the <b>max_jobs_to_release_for_user</b> option is less than or equal to <b>0</b>, all jobs are released for each user.</li> <li>• If the <b>max_jobs_to_release_for_user</b> option is higher than <b>0</b>, the specified number of jobs is submitted for each user on a cyclic basis. For example, if <b>max_jobs_to_release_for_user=5</b>, the first <b>5</b> jobs are submitted for each user, then the following 5 jobs for each user, and so on, until all jobs for all users are submitted.</li> </ul> <p>If this option is set to <b>OFF</b>, it releases for each user only the number of jobs specified in the <b>max_jobs_to_release_for_user</b> option. The remaining jobs are submitted only when a new release job is submitted:</p> | 00      |

**Table 29. r3batch global configuration options (continued)**

| Option              | Description  | Default |
|---------------------|--|---------|
|                     | <ul style="list-style-type: none"> <li>• If the <b>max_jobs_to_release_for_user</b> option is less than or equal to <b>0</b>, all jobs are released for each user.</li> <li>• If the <b>max_jobs_to_release_for_user</b> option is higher than <b>0</b>, only the specified number of jobs is submitted, then no other job is submitted until the new release job. If <b>max_jobs_to_release_for_user=5</b>, the first <b>5</b> jobs are submitted for each user, then no other job is submitted until the new release job.</li> </ul> <p>This option is present both in global and local options. If you define it in both configuration files, the local value overrides the global one.</p> |         |
| <b>var_sem_proj</b> | (Optional) The project ID for the variant semaphore.   | b       |

| Value |  |  |
|-------|--|--|
|       | <p>If the <b>max_jobs_to_release_for_user</b> option is higher than 0, only the specified number of jobs is submitted, then no other job is submitted until the new release job. If <b>max_jobs_to_release_for_user=5</b>, the first 5 jobs are submitted for each user, then no other job is submitted until the new release job.</p> |  |

Modifying the default values of the semaphore options is particularly useful when the IDs that are generated would be the same as the IDs already used by other applications.

On UNIX and Linux, to resolve the problem of duplicated IDs, IBM Workload Scheduler for SAP uses system-5 semaphores to synchronize critical ABAP function module calls. It uses one semaphore for job-related tasks and another one for tasks related to variant maintenance.

To synchronize on the same semaphore, the communication partners must use the same identifier. There are several ways to choose this identifier. IBM Workload Scheduler for SAP uses two parameters: a path name and a project ID (which is a character value). The path name parameter is the fully qualified path to the options file. The project ID is taken from the options described in [Table 29: r3batch global configuration options on page 145](#). If these options are omitted, IBM Workload Scheduler for SAP uses default values, which work for most installations.

 **Note:**



1. The semaphore options must be edited directly in the global options file using a text editor; you cannot use the options editor to modify these values.
2. If two semaphore options are assigned the same value, all the semaphore values are reset according to the following rule:

**job\_sem\_proj**

It keeps the value assigned, or its default value.

**var\_sem\_proj**

It is reset to the first character that, in the ASCII table, follows the value assigned to

`var_sem_proj`.

**icp\_sem\_proj**

It is reset to the second character that, in the ASCII table, follows the value assigned to

`var_sem_proj`.

**dep\_sem\_proj**

It is reset to the third character that, in the ASCII table, follows the value assigned to

`var_sem_proj`.

## Defining the local options

Table 30: [r3batch local configuration options on page 147](#) lists the options that you can specify only in the *local* configuration files.

**Table 30. r3batch local configuration options**

| Option                 | Description  |
|------------------------|--|
| <b>bapi_sync_level</b> | <p>(Optional) Specifies the synchronization level between the SAP function modules BAPI_XBP_JOB_COPY and BAPI_XBP_JOB_START_ASAP. Allowed values are:</p> <p><b>high</b></p> <p>All RFC calls between BAPI_XBP_JOB_START_ASAP and BAPI_XBP_JOB_COPY are synchronized. This is the default.</p> <p><b>medium</b></p> <p>The RFC calls to BAPI_XBP_JOB_START_ASAP are synchronized.</p> <p><b>low</b></p> <p>The RFC calls are not synchronized.</p> |
| <b>blank_libpath</b>   | <p>(Optional) Clears (ON) the operating system variables LD_LIBRARY_PATH and LIBPATH. The default value is OFF.</p>  |

Table 30. r3batch local configuration options (continued)

| Option                              | Description   |
|-------------------------------------|---|
| <b>fn_cache_enabled</b>             | (Optional) Enables or disables the file cache on the agent. Can be ON (default value).  |
| <b>fn_cache_purge_interval</b>      | (Optional) Specifies the time of validity (in days) of the cached files. If it is left unspecified or set equal to or less than 0, the files are valid indefinitely.  |
| <b>get_job_status_retry</b>         | (Optional) Sets the number of times a Remote Function Call must be attempted to retrieve the actual status of an SAP Job. Allowed values are in the range from 1 to 9999. The default value is 5.   |
| <b>get_job_status_retry_delay</b>   | (Optional) Sets the number of seconds between two consecutive calls of a Remote Function Call. Allowed values are in the range from 1 to 9999.  |
| <b>job_duration</b>                 | <p>(Optional) Enables (ON) that the CPU time value in the production plan report that is run from the Dynamic Workload Console is set to the actual duration of the SAP job. Default value is OFF.</p> <p>To retrieve the job duration from the SAP system, ensure that the authorization profile contains the following authorization objects:</p> <ul style="list-style-type: none"> <li>• S_DEVELOP</li> <li>• S_TCODE with parameter SE38 (only for SAP 6.40 and 7.00)</li> </ul> <p>For details about the authorization profile, see <a href="#">Creating the authorization profile for the IBM Workload Scheduler user on page 130</a>.</p> |
| <b>max_jobs_to_release_for_user</b> | Defines the maximum number of jobs released for each user each time the release job is submitted. If this option is less than or equal to 0, the option is ignored and all jobs are released when the release job is submitted. This option is present both in global and local options. If you define it in both configuration files, the local value overrides the global one.  |
| <b>primm_enable</b>                 | (Optional) Enables (ON) the SAP print parameter PRIMM (Print Immediately) for all jobs. The default value is OFF.   |
| <b>prnew_enable</b>                 | (Optional) Enables (ON) the SAP print parameter PRNEW (New Spool Request) for all jobs. The default value is OFF.   |
| <b>prrel_enable</b>                 | (Optional) Enables (ON) the SAP print parameter PRREL (Print Release) for all jobs. The default value is OFF.   |
| <b>prsap_enable</b>                 | (Optional) Enables (ON) the SAP print parameter PRSAP (Print SAP Cover Page) for all jobs. The default value is OFF.  |

Table 30. r3batch local configuration options (continued)

| Option  | Description   |
|---|---|
| <b>prunx_enable</b>                             | (Optional) Enables (ON) the SAP print parameter PRUNX (Print Operating System Cover Page) for all jobs. The default value is OFF.   |
| <b>release_all_intercepted_jobs_for_request</b> | <p>Releases jobs for each user on a cyclic basis, based on the number of jobs specified in the <b>max_jobs_to_release_for_user</b> option. The default value is <b>ON</b>, which means that all jobs are submitted for each user:</p> <ul style="list-style-type: none"> <li>• If the <b>max_jobs_to_release_for_user</b> option is less than or equal to <b>0</b>, all jobs are released for each user.</li> <li>• If the <b>max_jobs_to_release_for_user</b> option is higher than <b>0</b>, the specified number of jobs is submitted for each user on a cyclic basis. For example, if <b>max_jobs_to_release_for_user=5</b>, the first <b>5</b> jobs are submitted for each user, then the following 5 jobs for each user, and so on, until all jobs for all users are submitted.</li> </ul> <p>If this option is set to <b>OFF</b>, it releases for each user only the number of jobs specified in the <b>max_jobs_to_release_for_user</b> option. The remaining jobs are submitted only when a new release job is submitted:</p> <ul style="list-style-type: none"> <li>• If the <b>max_jobs_to_release_for_user</b> option is less than or equal to <b>0</b>, all jobs are released for each user.</li> <li>• If the <b>max_jobs_to_release_for_user</b> option is higher than <b>0</b>, only the specified number of jobs is submitted, then no other job is submitted until the new release job. If <b>max_jobs_to_release_for_user=5</b>, the first <b>5</b> jobs are submitted for each user, then no other job is submitted until the new release job.</li> </ul> <p>This option is present both in global and local options. If you define it in both configuration files, the local value overrides the global one.</p> |
| <b>r3client</b>                                 | (Mandatory) The SAP client number.  |
| <b>r3gateway</b>                                | (Optional) The host name of the SAP gateway.  |
| <b>r3group</b>                                  | (Optional) The name of the SAP logon group.   |
| <b>r3gwservice</b>                              | (Optional) The service number of the SAP gateway.   |
| <b>r3host</b>                                   | (Mandatory) The host name of the SAP message server when using logon groups, or the host name of the application server in all other cases.   |

**Table 30. r3batch local configuration options (continued)**

| Option                       | Description  |
|------------------------------|--|
|                              | If this server can be reached through one or more SAP gateways, use a string in the format <code>/H/gateway/H/</code> for each of them.  |
| <b>r3instance</b>            | (Mandatory) The SAP instance number.<br><br>If <b>r3group</b> is set, this option is ignored.  |
| <b>r3password</b>            | (Mandatory) The password for the <b>r3user</b> . Ensure that you enter the same password when creating this user in the SAP system. It can be a maximum of eight characters and is stored in encrypted format. The value is case sensitive.<br><br>For information about how to encrypt the password see <a href="#">Encrypting SAP user passwords on page 162</a> . |
| <b>r3sid</b>                 | (Mandatory) The SAP system ID.   |
| <b>r3snclib</b>              | (Optional) Specifies the path and file name of the SNC library. This option becomes mandatory if <b>r3sncmode</b> is activated (1).  |
| <b>r3sncmode</b>             | (Optional) Enables (1), or disables (0), secure network communication (SNC) between r3batch and the SAP R3 system. The default setting is (0). Refer to the SAP documentation for more information about using the SAP cryptographic Library for SNC.  |
| <b>r3sncmyname</b>           | (Optional) Specifies the name of the user sending the RFC for secure network communication (SNC).  |
| <b>r3sncpartname</b>         | (Optional) Specifies the SNC name of the SAP R3 communication partner (application server). This option becomes mandatory if <b>r3sncmode</b> is activated (1).  |
| <b>r3sncqop</b>              | (Optional) Specifies the secure network communication (SNC) protection level.  |
| <b>r3user</b>                | (Mandatory) The name of the SAP user with which the access method connects to the SAP system. It must have the appropriate privileges for running background jobs. It is sometimes also called the Maestro™ User ID.   |
| <b>report_list_max_limit</b> | (Optional) Sets the maximum number of ABAP reports which can be loaded. The default value is -1, which means no limit.   |

## Defining the common options

[Table 31: r3batch common configuration options on page 151](#) lists additional options that you can specify in either configuration file.

Table 31. r3batch common configuration options



| Option                       | Description  | Default |
|------------------------------|--|---------|
| <b>bdc_job_status_failed</b> | <p>(Optional) How IBM Workload Scheduler sets the completion status of a job running BDC sessions, according to a possible BDC processing failure. The allowed values are:</p> <p><b>n</b></p> <p>If at least <i>n</i> BDC sessions failed (where <i>n</i> is an integer greater than 0), IBM Workload Scheduler sets the job completion status as failed.</p> <p><b>all</b></p> <p>If all the BDC sessions failed, IBM Workload Scheduler sets the job completion status as failed.</p> <p><b>ignore</b></p> <p>When all the BDC sessions complete, regardless of their status, IBM Workload Scheduler sets the job completion status as successful. This is the default.</p> <p> <b>Note:</b> This option is ignored if you defined the job by setting the <b>nobdc</b> or <b>nobdcwait</b> option. For details about these options, see <a href="#">Task string to define SAP jobs on page 178</a>.</p> | ignore  |
| <b>ccms_alert_history</b>    | <p>(Optional) Enables (ON) or disables (OFF) the product to retrieve all the matching CCMS alerts, included those that were generated before the monitoring process started. The default value is OFF, meaning that the product retrieves only the CCMS alerts that are generated after the monitoring process started.</p> <p> <b>Note:</b> This option takes effect the first time you start the CCMS alert monitoring. If you initially set it to OFF and later you want to retrieve the alerts generated before the monitoring process started, stop the monitoring and delete the <code>XAname_r3xalmon.cfg</code> file located in <code>TWA_DATA_DIR/methods/r3evmon_cfg</code> on UNIX® and <code>TWA_home\methods\r3evmon_cfg</code> on Windows™. In the options file, set <code>ccms_alert_history=on</code> and start the monitoring process again.</p>   | OFF     |
| <b>commit_dependency</b>     | <p>(Optional) Enables (ON) or disables (OFF) the product to commit internetwork dependencies after processing.</p>   | OFF     |

Table 31. r3batch common configuration options (continued)


| Option                     | Description   | Default |
|----------------------------|---|---------|
|                            | <p>If you enable this option, internetwork dependencies are committed immediately by default. If you disable or delete this option, the <b>-commit</b> parameter set in the internetwork dependency definition is applied. For details about the <b>-commit</b> parameter, see <a href="#">Table 41: Parameters to define an SAP internetwork dependency on page 256</a>.</p>   |         |
| <b>enable_appl_rc</b>      | <p>(Optional) Enables (ON) or disables (OFF) the mapping of the application return code to the IBM Workload Scheduler return code.</p> <p> <b>Note:</b> This feature does not modify the exit code of the access method. For more details, refer to the <b>rccondsucc</b> keyword in the job definition documented in <i>IBM Workload Scheduler: User's Guide and Reference</i>.</p>                 | OFF     |
| <b>evmon_interval</b>      | <p>(Optional) The polling rate (in seconds) that the <code>r3evmon</code> process applies to monitor the list of events.</p>  | 60      |
| <b>ifuser</b>              | <p>(Optional) The ID of the user who runs the access method to retrieve job information.</p>  | None    |
| <b>idoc_no_history</b>     | <p>(Optional) Enables (ON) or disables (OFF) the product to retrieve only IDoc data that is generated after the monitoring process started. If you specify OFF, all matching IDocs are retrieved, including those that were generated before the monitoring process started.</p> <p>When processing this option, <code>r3evmon</code> uses the <code>XName_r3idocmon.cfg</code> file to retrieve the date and time for the next monitoring loop.</p>                                  | ON      |
| <b>idoc_shallow_result</b> | <p>(Optional) Enables (ON) or disables (OFF) the product to retrieve only the most recent matching IDocs.</p> <p>For example, suppose you set <code>idoc_shallow_result=ON</code>. If the status of an IDoc changes several times during the monitoring interval and the same status, matching an event rule condition, occurs more than once in the sequence of statuses, only the most recent matching IDoc is retrieved. If you specify OFF, all matching IDocs are retrieved.</p> | ON      |



Table 31. r3batch common configuration options (continued)

| Option                     | Description   | Default               |
|----------------------------|---|-----------------------|
| <b>jobdef</b>              | (Optional) If enabled, you can use the Dynamic Workload Console to define jobs, in addition to the command line. Specify <code>r3batch</code> to enable the option, and any other value to disable it.  | <code>r3batch</code>  |
| <b>job_interceptable</b>   | (Optional) Enables ( <code>ON</code> ) or disables ( <code>OFF</code> ) the job launched by r3batch to be intercepted by SAP. If enabled, when r3batch launches a job and the SAP job interception feature is enabled, the job can be intercepted if it matches previously defined criteria. If disabled, the job launched by r3batch cannot be intercepted by SAP. | <code>OFF</code>      |
| <b>ljuser</b>              | (Optional) The ID of the user who runs the access method to launch jobs (LJ tasks) and manage jobs (MJ tasks).  | None                  |
| <b>log_r3syslog</b>        | (Optional) Enables ( <code>ON</code> ) or disables ( <code>OFF</code> ) the access method to write the latest entries from the SAP syslog to its trace file when an RFC returns with a general error.   | <code>OFF</code>      |
| <b>long_interval</b>       | (Optional) The maximum interval, in seconds, between status checks. It cannot be greater than 3600 seconds. See also <i>short_interval</i> .  | <code>3600</code>     |
| <b>max_n0_counter</b>      | (Optional) The maximum value of the N0 counter. If the N0 counter reaches the specified value, it starts again from 0.  | <code>2^15 - 1</code> |
| <b>max_name_counter</b>    | (Optional) The maximum value of the variant name counter. If the name counter reaches the specified value, it starts again from 0.  | <code>40</code>       |
| <b>n0_counter_policy</b>   | (Optional) The N0 counter policy:<br><br><b>step</b><br>The N0 counter is increased once for every step.<br><br><b>job</b><br>The N0 counter is increased once for every job.   | <code>job</code>      |
| <b>name_counter_policy</b> | (Optional) The name counter policy:<br><br><b>step</b><br>The name counter is increased once for every step.<br><br><b>job</b><br>The name counter is increased once for every job.   | <code>job</code>      |
| <b>nojobdefs</b>           | (Optional) Disables ( <code>1</code> ) or enables ( <code>0</code> ) the definition of new SAP jobs using the Dynamic Workload Console. If this option is set to 1, you   | <code>0</code>        |

**Table 31. r3batch common configuration options (continued)**

| Option                    | Description   | Default   |
|---------------------------|---|---|
|                           | must create the job definitions in the SAP job before creating the IBM Workload Scheduler job that is going to schedule them.   |   |
| <b>oldcopy</b>            | (Optional) Enables (1) or disables (0) the access method to use the old way of copying jobs, even though the function module BAPI_XBP_JOB_COPY is present on the SAP system.  | 0   |
| <b>pchain_recover</b>     | <p>(Optional) The action taken by IBM Workload Scheduler when you rerun a job that submits a process chain. The allowed values are:</p> <p><b>rerun</b></p> <p>IBM Workload Scheduler creates another process chain instance and submits it to be run again.</p> <p><b>restart</b></p> <p>IBM Workload Scheduler restarts the original process chain from the failing processes to the end.</p> <p>For details about rerunning a process chain job, refer to <a href="#">Rerunning a process chain job on page 239</a>.</p> | rerun   |
| <b>pchain_details</b>     | (Optional) Enables (ON) or disables (OFF) the display of details about an SAP process chain that you scheduled as an IBM Workload Scheduler job.  | OFF   |
| <b>pchainlog_bapi_msg</b> | (Optional) Enables (ON) or disables (OFF) the product to retrieve additional messages from the BAPI calls from the SAP Business Warehouse process chains and appends them to the stdlist of IBM Workload Scheduler.   | ON  |
| <b>pchainlog_level</b>    | <p>(Optional) Supplements the option <b>retrieve_pchainlog</b>.</p> <p>Specifies which level of process chain logs you want to retrieve. Allowed values are:</p> <p><b>1</b></p> <p>Only the first level of process chain is logged.</p> <p><b>level_number</b></p> <p>Process chains are logged down to the level of chain you indicate here. For example, if you indicate 2 only the first two levels are logged.</p>   | If you omit this option, and leave <b>retrieve_pchainlog</b> set to ON, the default is level 1. |

Table 31. r3batch common configuration options (continued)



| Option                       | Description  | Default   |
|------------------------------|--|---|
|                              | <p><b>all</b></p> <p>All process chains are logged.</p>  |   |
| <b>pchainlog_verbosity</b>   | <p>(Optional) Supplements the option <b>retrieve_pchainlog</b>.</p> <p>Specifies which type of process chain logs you want to retrieve. Allowed values are:</p> <p><b>chains_only</b></p> <p>Logs only the process chains.</p> <p><b>chains_and_failed_proc</b></p> <p>In addition to the process chains, logs all failed processes.</p> <p><b>complete</b></p> <p>Logs all process chains and processes.</p> <p> <b>Note:</b> This option affects the entire process chain; verbosity cannot be reduced for individual processes.</p> | <p>If you omit this option, and leave <b>retrieve_pchainlog</b> set to <b>ON</b>, the default is <b>complete</b>.</p> |
| <b>pc_launch_child</b>       | <p>(Optional) Enables (<b>ON</b>) or disables (<b>OFF</b>) the product to launch child jobs that are in scheduled state.</p> <p> <b>Note:</b> You can use this option only if you activated the parent-child feature on the SAP system. On the XBP 2.0 or later SAP system, you can activate this feature by using the INITXBP2 ABAP report.</p>  | <b>OFF</b>  |
| <b>placeholder_abap_step</b> | <p>(Optional) If XBP version 2.0 is used, the name of the ABAP report used as the dummy step in the SAP placeholder job that is created to monitor an SAP event defined as external dependency.</p>  | <p>If this option is not specified, either as global or local option, the default <b>BTCTEST</b> is used.</p>         |
| <b>qos_disable</b>           | <p>(Optional) Enables (<b>ON</b>) or disables (<b>OFF</b>) the creation of the environment variable QOS_DISABLE on Microsoft™ Windows™ systems that use the Quality of Service (QoS) feature, before <b>r3batch</b> opens an RFC connection.</p>   | <b>OFF</b>  |

Table 31. r3batch common configuration options (continued)




| Option                    | Description   | Default |
|---------------------------|---|---------|
|                           | Without this option, because of problems in the implementation of the QoS service, the connection between <code>r3batch</code> and the SAP RFC library does not work.   |         |
| <b>r3auditlevel</b>       | (Optional) The audit level for the XBP. A number from 0 (low) to 3 (high).  | 3       |
| <b>rcmap</b>              | (Optional) Enables (ON) or disables (OFF) the return code mapping capabilities of Access method for SAP.  | ON      |
| <b>retrieve_applinfo</b>  | (Optional) Enables (ON) or disables (OFF) the retrieval and appending of the SAP application log to the <code>stdlist</code> of IBM Workload Scheduler.   | OFF     |
| <b>retrieve_ipaklog</b>   | (Optional) Enables (ON) or disables (OFF) the retrieval and appending of the SAP BW InfoPackage logs to the <code>stdlist</code> of IBM Workload Scheduler.<br><br> <b>Note:</b> The retrieval and appending of SAP BW InfoPackage job logs to the <code>stdlist</code> might be time-consuming for jobs that produce large logs.  | ON      |
| <b>retrieve_joblog</b>    | (Optional) Enables (ON) or disables (OFF) the retrieval and appending of the SAP job logs to the <code>stdlist</code> of IBM Workload Scheduler.<br><br> <b>Note:</b> <ol style="list-style-type: none"> <li>1. The retrieval and appending of job logs to the <code>stdlist</code> might be time-consuming for jobs that produce large logs.</li> <li>2. If you disable the retrieval of the job logs, you also disable the return code mapping function for the log entries.</li> <li>3. This option does not affect the <code>BDC Wait</code> feature.</li> </ol> | ON      |
| <b>retrieve_pchainlog</b> | (Optional) Enables (ON) or disables (OFF) the retrieval and appending of the SAP BW process chain logs to the <code>stdlist</code> of IBM Workload Scheduler.<br><br> <b>Note:</b>   | ON      |

Table 31. r3batch common configuration options (continued)



| Option                   | Description  | Default         |
|--------------------------|--|-----------------|
|                          |  <ol style="list-style-type: none"> <li>1. The retrieval and appending of SAP BW process chain logs to the <code>stdlist</code> might be time-consuming for jobs that produce large logs.</li> <li>2. If you disable the retrieval of the SAP BW process chain logs, you also disable the return code mapping function for the log entries.</li> <li>3. This option on its own retrieves the log of only the first level of a process chain. To retrieve more complete logs, use this option with the <code>pchainlog_level</code> and <code>pchainlog_verbosity</code> options.</li> </ol> |                 |
| <b>retrieve_spoolist</b> | <p>(Optional) Enables (<code>ON</code>) or disables (<code>OFF</code>) the retrieval and appending of the SAP job spool lists to the <code>stdlist</code> of IBM Workload Scheduler.</p>  <b>Note:</b> <ol style="list-style-type: none"> <li>1. The retrieval and appending of SAP job spool lists to the <code>stdlist</code> might be time-consuming for jobs that produce large spool lists.</li> <li>2. If you disable the retrieval of the SAP job spool lists, you also disable the return code mapping function for the spool list entries.</li> </ol>                              | <code>ON</code> |
| <b>retry</b>             | (Optional) The retry count for SAP function module calls. Specify an integer greater than 0.   | 5               |
| <b>rfc_interval</b>      | (Optional) The polling rate (in milliseconds) with which r3batch listens for results of RFC requests. The rate cannot exceed 1,000 milliseconds. Consider that the lower the value of the <code>rfc_interval</code> option, the higher the frequency with which RFC request results are collected and, as a consequence, CPU consumption on the r3batch system is high.  | 10              |
| <b>rfc_open_delay</b>    | (Optional) The maximum number of seconds to wait between two consecutive calls before opening an RFC connection.   | 1800            |

Table 31. r3batch common configuration options (continued)


| Option   | Description  | Default |
|--|--|---------|
| <b>rfc_open_retry</b>                          | (Optional) The retry count for opening an RFC connection to the SAP system. Specify an integer greater than 0 to limit the number of retries, or <code>-1</code> for an unlimited number of retries.   | 5       |
| <b>rfc_timeout</b>                             | (Optional) The time (in seconds) that <code>r3batch</code> waits before canceling a non-responding RFC communication. Allowed values are in the range from 0 to 9999; 0 means no timeout.  | 600     |
| <b>short_interval</b>                          | (Optional) The minimum interval, in seconds, between status checks. It cannot be less than 2 seconds. Setting this option to low values makes the notification of status changes faster, but increases the load on the hosting machine. See also <i>long_interval</i> .  | 10      |
| <b>throttling_enable_job_class_inheritance</b> | <p>(Optional) Enables (<code>ON</code>) or disables (<code>OFF</code>) the inheritance of priority class.</p> <p><code>ON</code> means that the intercepted job inherits the priority class of its progenitor job, if it is higher than its own class; otherwise it keeps its own class. <code>OFF</code> means that the intercepted job keeps its own class, regardless of its progenitor's class.</p> <p> <b>Note:</b> By setting this option, the parent-child feature is automatically enabled on the SAP system.</p> | ON      |
| <b>throttling_enable_job_interception</b>      | <p>(Optional) Enables (<code>ON</code>) the job interception feature at job throttler startup, or keeps the current setting (<code>OFF</code>).</p> <p><code>ON</code> means that when the job throttler starts, it enables the job interception feature on the SAP system. When the job throttler is stopped, the job interception feature is also automatically restored to the setting that was previously configured on the SAP system. <code>OFF</code> means that the job interception feature is kept as it is currently set in the SAP system.</p>   | ON      |
| <b>throttling_job_interception_version</b>     | <p>Specifies the BC-XBP interface version to be used when the job throttler starts. Valid values are:</p> <ul style="list-style-type: none"> <li>• 2</li> <li>• 3</li> </ul> <p>The default BC-XBP interface version that is used is 2 (version 2.0).</p>  | 2       |

Table 31. r3batch common configuration options (continued)



| Option                                | Description  | Default  |
|---------------------------------------|--|--|
| <b>throttling_interval</b>            | (Optional) The interval (in seconds) between each job throttling run.  | 5  |
| <b>throttling_max_connections</b>     | (Optional) The maximum number of connections (connection pool size) that the job throttler can open to communicate with the SAP system. The minimum value is 3.  | 5  |
| <b>throttling_release_all_on_exit</b> | (Optional) Enables (ON) or disables (OFF) the release of all intercepted jobs.<br><br>ON means that when the job throttler is stopped, it releases all the intercepted jobs. OFF means that when the job throttler is stopped, it does not release the intercepted jobs therefore the jobs remain intercepted, in scheduled state. | ON   |
| <b>throttling_send_ccms_data</b>      | (Optional) Enables (ON) or disables (OFF) the sending of data from job throttling to the SAP CCMS Monitoring Architecture.<br><br>ON means that the job throttler sends its status data to CCMS continuously. OFF means that the job throttler does not send its status to CCMS.   | OFF  |
| <b>throttling_send_ccms_rate</b>      | (Optional) Rate (in number of runs) at which the job throttler sends its status data to the SAP CCMS monitoring architecture. The minimum value is 1, meaning that the job throttler sends the data at every run.  | 1  |
| <b>twsmeth_cp</b>                     | (Optional) The code page that r3batch uses to write its output.<br><br>This option must be consistent with <b>twsmeth_lang</b> . It can be any of the existing TIS codepages.  | The code page used by the IBM Workload Scheduler workstation that hosts the r3batch access method. |
| <b>twsmeth_lang</b>                   | (Optional) The language used to report messages.<br><br>This option must be consistent with <b>twsmeth_cp</b> .  | The language of the locale of the workstation that hosts the r3batch access method.                |
| <b>twsxa_cp</b>                       | (Optional) The encoding used by r3batch to establish RFC connections with SAP systems.<br><br>Use this option if r3batch is not Unicode-enabled. Possible values are:<br><br>• 1100<br>• 1103  | 1100   |

**Table 31. r3batch common configuration options (continued)**


| Option            | Description   | Default |
|-------------------|---|---------|
|                   | <ul style="list-style-type: none"> <li>• 8000</li> <li>• 8300</li> <li>• 8400</li> </ul>  |         |
| <b>twsxa_lang</b> | <p>(Optional) The language used to log in to SAP systems. Specify one of the following (DE, EN, and JA can be set from the Option Editor. The other languages can be set using any text editor):</p> <p><b>DE</b><br/>German</p> <p><b>EN</b><br/>English</p> <p><b>ES</b><br/>Spanish</p> <p><b>FR</b><br/>French</p> <p><b>IT</b><br/>Italian</p> <p><b>JA</b><br/>Japanese</p> <p><b>KO</b><br/>Korean</p> <p><b>pt_BR</b><br/>Brazilian Portuguese</p> <p><b>zh_CN</b><br/>Simplified Chinese</p> <p><b>zh_TW</b><br/>Traditional Chinese</p> | EN      |



Table 31. r3batch common configuration options (continued)

| Option                          | Description  | Default   |
|---------------------------------|--|---|
|                                 |  <b>Note:</b> If you are working with InfoPackages and process chains on operating systems that do not support Unicode, this option must be set.  |   |
| <b>use_fips</b>                 | (Optional) Enables (ON) or disables (OFF) the FIPS mode of operation for IBM Workload Scheduler.   | OFF   |
| <b>utf8cmdline</b>              | (Optional) Enables (1) or disables (0) the encoding of extended parameters in UTF-8 format. The default value is 0.  |  <b>Note:</b> If you have both global and local options files and you want to change the default value for <b>utf8cmdline</b> , modify the local options file because this overrides the global options. |
| <b>variant_delay</b>            | (Optional) The time, in seconds, that r3batch allows the SAP system to clean up the structures used for communication between r3batch and the SAP system. This option is valid when you launch a job that uses extended variants and requires a copy of a job template. Use this option only when you want to reduce r3batch response time, because it increases the load on the hosting machine. Higher values of <b>variant_delay</b> increase the response time and decrease the load.<br><br>Allowed values are in the range from 0 to 3600. | 10  |
| <b>variant_selection_screen</b> | (Optional) Specifies the functional interface used to read report selection screens. Specify one of the following:   | Custom  |

**Table 31. r3batch common configuration options (continued)**

| Option            | Description   | Default   |
|-------------------|---|---|
|                   | <p><b>Custom</b></p> <p>To communicate with the SAP system using the IBM® Workload Scheduler custom function module.</p> <p><b>SAP</b></p> <p>To communicate with the SAP system using the XBP 3.0 function module.</p>   |   |
| <b>xbpversion</b> | <p>(Optional) The XBP version used on the target SAP system. Specify an integer value. This value overwrites the XBP version automatically determined during RFC logon.</p> <p> <b>Note:</b> For details about XBP 3.0 and SAP NetWeaver 2004s with SP9, refer to the SAP Note 977462.</p> | The XBP version determined by r3batch during RFC logon from the SAP system. |

## SAP option file example

Below is an example of an options file for SAP. It can help you determine your specific site requirements, although your options file might be different.

```
r3client=100
r3host=/H/tiraix64.lab.rome.abc.com
r3instance=00
r3password={3des}Hchwu6IsF5o=
r3sid=GS7
r3user=twstest
long_interval=120
r3auditlevel=3
short_interval=10
twsha_lang=EN
```

## Encrypting SAP user passwords

When you add your entries in the options file with the Option Editor or from the Dynamic Workload Console, the password value is automatically encrypted before it is written in the file. If you modify the file with a text editor, you must run the **enigma** program to encrypt the password before writing it in the file. To run the encryption program, enter the following command:

```
enigma [password]
```

You can include the password on the command line or enter it in response to a prompt. The program returns an encrypted version that you can then enter in the options file.

## Configuration options usage

The format of the configuration file is the following:

```
option1=value1
option2=value2
option3=value3
...
```

with no blanks before the option, after the value, or before or after the equals (=) character.

You can put all the common information, such as the `LJuser`, `IFuser`, `JobDef`, and `LogFileNames` options in `r3batch.opts`, while you can put tailored data for the target SAP system of the extended agent or dynamic agent (for example, `SAP1`) in a local configuration file (for example, `XA1_r3batch.opts`).

You can put a local option in the global configuration file if you want to give the same option to all the `r3batch` instances. For example, if the SAP user name is the same in all your SAP systems, you can place the `r3user` option in the global file without duplicating that information in all the local configuration files.

A global option, such as `job_sem_proj`, only has effect in the global configuration file. If you put global options in a local file they have no effect.

`r3batch` reads the global configuration file first and then the local file. Every option (except the global options) contained in the local configuration file will override those in the global file. For example, if both the global and the local configuration files contain the `r3user` option, `r3batch` uses the one in the local file.

There are six mandatory options that `r3batch` requires:

- `r3client`
- `r3host`
- `r3instance`
- `r3password`
- `r3sid`
- `r3user`

You can put them all in the local configuration file or you can spread them between the global and the local files. For example, you could put `r3user` and `r3password` in the global configuration file and `r3sid`, `r3instance`, `r3client`, and `r3host` in the local one.

The `r3user` option is both local and mandatory. It must be put either in the global configuration file or the local configuration file.



**Note:** These configuration files are not created during the installation process.

## Connecting to the SAP system

The Access method for SAP uses the SAP remote connection call (RFC) library to connect to the SAP system. The connection address for an SAP system is denoted as a `connection string`.

To successfully use the SAP R/3 access method, you must first install the SAP RFC libraries, as described in the System Requirements Document in the SAP R/3 Access Method Requirements section.

## Connecting to a specific application server

To connect to a specific application server, you enter strings which, according to the complexity of the networks, might be more or less complex and contain passwords to secure the routers.

In its basic form, a connection string consists of the host name (or IP name) of an SAP application server; for example:

```
/H/hemlock.romlab.rome.abc.com
```

This type of connection string works only in very simple network environments, where all application servers can be reached directly through TCP/IP. Usually, modern companies use more complex network topologies, with a number of small subnetworks, which cannot communicate directly through TCP/IP. To support this type of network, the SAP RFC library supports SAP routers, which are placed at the boundaries of the subnetworks and act as proxies. For this type of network, the connection string is a composite of basic connection strings for each SAP router, followed by the basic connection string for the target SAP system; for example:

```
/H/litespeed/H/amsaix33/H/hemlock.romlab.rome.abc.com
```

Moreover, you can secure the SAP routers with passwords, to prevent unauthorized access. In this case, the basic connection string for the SAP router is followed by `/P/` and the password of the router.



**Note:** The SAP RFC library limits the length of the connection string to a maximum of 128 characters. This is a real limitation in complex network environments. As a workaround, it is recommended to use simple host names, without the domain name whenever possible. Alternatively, you can use the IP address, but this is not recommended, because it is difficult to maintain.

IBM Workload Scheduler for SAP supports both types of connection strings, basic and composite, where:

### **r3host**

The connection string.

### **r3instance**

The SAP instance number.

### **r3sid**

The SAP system ID.

For example:

```
r3host=/H/litespeed/H/amsaix33/H/hemlock.romlab.rome.abc.com
r3instance=00
r3sid=TV1
```

## Connecting to a logon group

### About this task

In large SAP installations, the application servers are usually configured in logon groups for load balancing and fault-tolerance purposes. Load balancing is done by a dedicated server, called the `message server`. The message server automatically assigns users to the application server with the least workload of the logon group it controls.

Ensure that the file services (on UNIX: `/etc/services` on Windows: `C:\Windows\system32\drivers\etc\services`) contain an entry for the message server port of the SAP system to which `r3batch` connects. The entry has the following format:

```
sapmsSID 36system_number/tcp
```

where `SID` is the SAP system ID, and `system_number` is the SAP system number.

Set the following options to configure `r3batch` to connect to a logon group:

#### **r3host**

The hostname of the message server.

#### **r3group**

The name of the logon group.

#### **r3sid**

The SAP system ID.

For example:

```
r3host=pwdf0647.wdf.sap-ag.de
r3group=PUBLIC
r3sid=QB6
```

## Configuring SAP event monitoring

This section provides detailed information about how to configure your system to monitor SAP events:

- [Prerequisite to defining event rules based on SAP events on page 165](#)
- [Monitoring SAP events on page 166](#)

## Prerequisite to defining event rules based on SAP events

### About this task

To be able to define event rules based on one or more SAP events, stop the IBM Workload Scheduler WebSphere Application Server Liberty Base and copy the following file (located on the system where you installed IBM Workload Scheduler:

### On UNIX operating systems

```
TWA_DATA_DIR/methods/SAPPlugin/SapMonitorPlugIn.jar
```

### On Windows operating systems

```
TWA_home\methods\SAPPlugin\SapMonitorPlugIn.jar
```

to the following directory of the master domain manager and of its backup nodes:

### On UNIX operating systems

```
TWA_DATA_DIR/eventPlugIn
```

### On Windows operating systems

```
TWA_home\eventPlugIn
```

For the changes to take effect, stop and restart the IBM Workload Scheduler WebSphere Application Server Liberty Base. If the master domain manager is connected to the Dynamic Workload Console, stop and restart also the Dynamic Workload Console Application Server.

## Monitoring SAP events

Whenever you define an event rule based on an SAP event in your IBM Workload Scheduler plan, that event is monitored by IBM Workload Scheduler. Monitoring SAP events is allowed only if you use XPB version 3.0, or later.

IBM Workload Scheduler monitors two types of SAP event:

### Events defined by the SAP system

The events that are triggered automatically by system changes, for example when a new operation mode is activated. This type of event cannot be modified by the user.

### Events defined by the user

The events that are triggered by ABAP or external processes, for example when a process triggers an SAP event to signal that external data has arrived and must be read by the SAP system. For details about how to trigger events by external processes, refer to [Raising an SAP event on page 193](#).

If you modify the `r3batch` option files, to make the changes effective you must stop and restart the extended agent monitoring processes with the following command. For UNIX only, this command must be entered by the owner of the IBM Workload Scheduler installation:

### Command syntax

```
r3evman { start | stop }
```

Where:

**start | stop**

The action to perform:

**start**

Starts monitoring SAP events.

**stop**

Stops monitoring SAP events.

## Defining SAP jobs

You must define some jobs to be able to run jobs on an SAP workstation from IBM Workload Scheduler.

To define and manage jobs on an SAP workstation from IBM Workload Scheduler, you must define the following:

### **Jobs in SAP that you want to run under IBM Workload Scheduler control**

You can define these jobs using standard SAP tools or using the Dynamic Workload Console.

### **Jobs in IBM Workload Scheduler that correspond to the jobs in SAP**

The IBM Workload Scheduler job definitions are used in scheduling and defining dependencies, but the SAP jobs are actually run.

You can define SAP job definitions from the Dynamic Workload Console and then have IBM Workload Scheduler launch the jobs in SAP R/3 using jobs defined on the following workstations that support the r3batch access method:

- An IBM Workload Scheduler extended agent workstation. A workstation that is hosted by a fault-tolerant agent or master workstation.
- A dynamic agent workstation.
- A dynamic pool.
- A z-centric workstation.

You can manage your SAP environment from both:

- An IBM Workload Scheduler distributed environment
- An IBM Z Workload Scheduler environment.

The SAP job definitions can reference the following types of SAP jobs:

- Standard R/3
- Business Warehouse Process Chains
- Business Warehouse InfoPackages

For information about Business Warehouse Process Chains and Business Warehouse InfoPackages, see [Using Business Information Warehouse on page 230](#).

## Creating SAP Standard R/3 jobs from the Dynamic Workload Console

How to create and manage an SAP job that is associated to an IBM Workload Scheduler job that manages it.

### **About this task**

You can easily create and manage Standard R/3 jobs on a remote SAP system entirely from the Dynamic Workload Console, and then continue to manage the remote SAP job from IBM Workload Scheduler.

The IBM Workload Scheduler job definition, available for both distributed and z/OS environments, maps to the newly created job on the SAP system. The SAP job can run on extended agent workstations, dynamic agent workstations, pools, dynamic pools, and workstations depending on the type of job definition you choose to create.



**Note:** Using this procedure to create a new IBM Z Workload Scheduler Agent SAP Standard R/3 job, you cannot manage variants. To manage variants, use the SAP graphical user interface or use the **List Jobs on SAP** entry from the navigation tree of the Dynamic Workload Console.

To create a new SAP Standard R/3 job on a remote SAP system that maps to an IBM Workload Scheduler job definition, you have to associate your SAP Standard R/3 jobs to IBM Workload Scheduler jobs and you can do it in either of the following ways:

- Starting from an SAP job: [Create an SAP job and associate it to an IBM Workload Scheduler job on page 168](#) or
- Starting from an IBM Workload Scheduler job ([Create an IBM Workload Scheduler job and associate it to an SAP job on page 170](#))
- Alternatively, you can simply create an SAP job on a remote SAP system, without having it managed by IBM Workload Scheduler: [Creating an SAP job from the Dynamic Workload Console on page 172](#).

When performing operations that require a connection to a remote SAP system, you must configure the SAP connection data. The connection is made through an IBM Workload Scheduler workstation with the r3batch access method installed. Each workstation can have one or more options files that can be used to customize the behavior of the r3batch access method, except for extended agent workstations, where only one options file can be defined and therefore a selection is not required. For information about setting the SAP connection data, see [Setting the SAP data connection on page 173](#).

## Create an SAP job and associate it to an IBM Workload Scheduler job

How to create a new SAP job that is associated to an IBM Workload Scheduler job that manages it.

### Before you begin

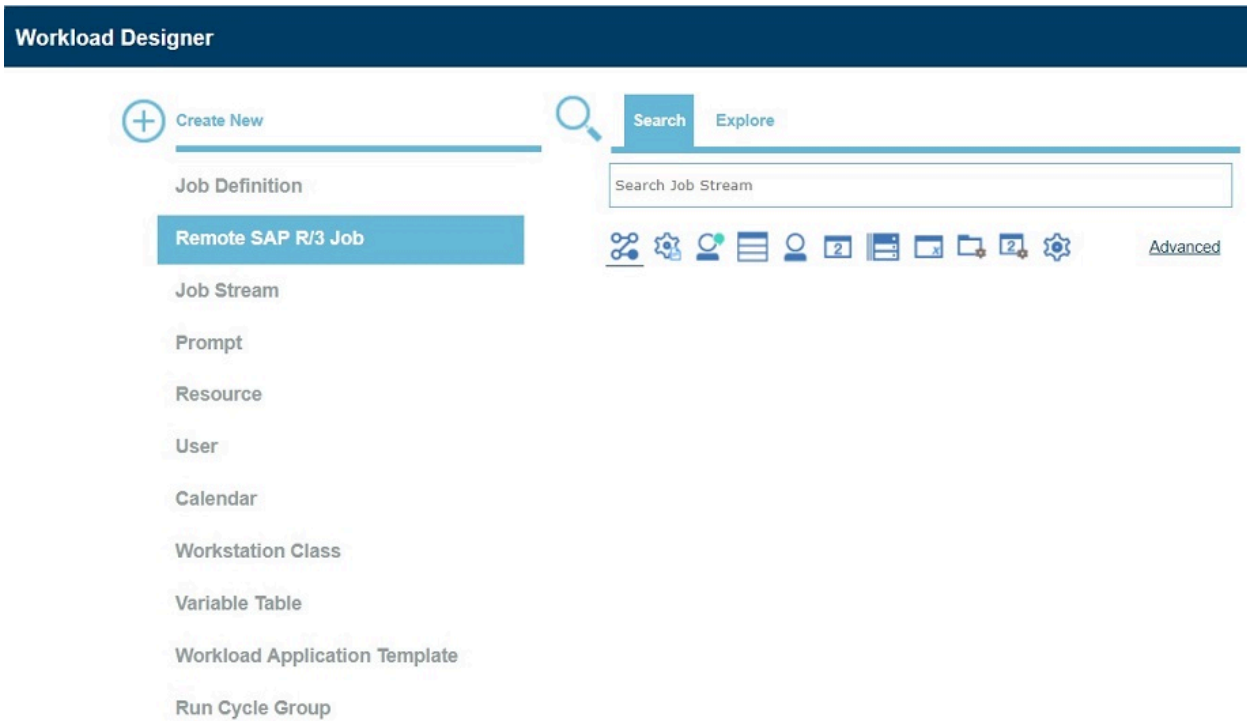
To be able to save your SAP job on a remote SAP system, you must specify the connection details. See [Setting the SAP data connection on page 173](#).

### About this task

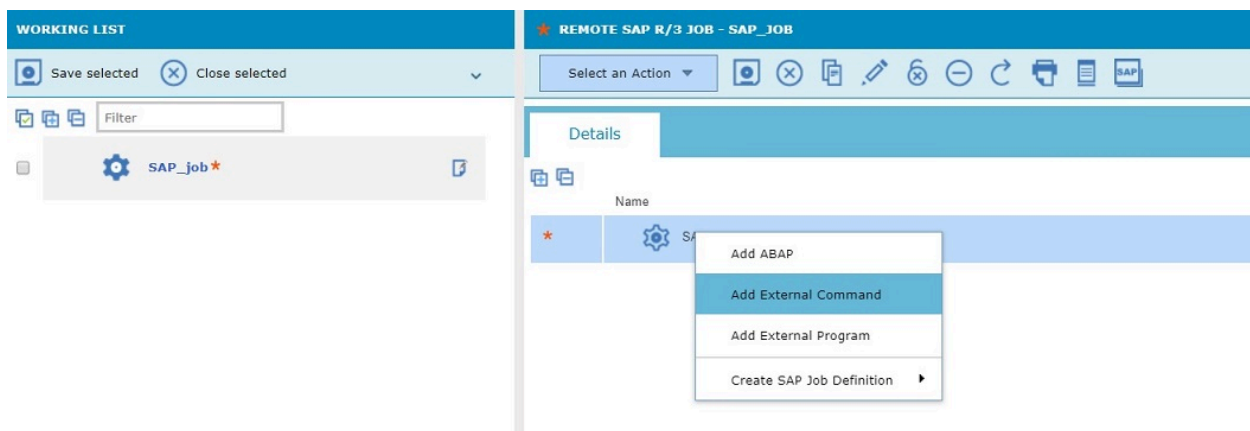
To create a new SAP job and then associate it to a new IBM Workload Scheduler job, perform the following steps:

1. Click **Administration > Workload Design > Manage Workload Definitions**.
2. Select an engine. The Workload Designer window is displayed.
3. From the Working List pane, click **New > Remote SAP R/3 Job**:





4. In the Properties pane, specify the properties for the SAP job definition you are creating using the tabs available. The tabs for each type of SAP job definition are similar, but there are some differences depending on the type of engine you selected and the type of workstation on which the job runs. For more detailed information about the UI elements on each tab, see the Dynamic Workload Console online help.
5. In the Details view, right-click the new job to add ABAP, External command or External program steps to it. It is mandatory to add at least one job step to the job before you can save the job:



6. Right-click the SAP job and click **Create SAP Job Definition** to create a new IBM Workload Scheduler job associated to the new job on SAP. Select the job definition in accordance with the engine and type of agent on which the job runs.

## SAP


For z/OS systems only. This job definition references an existing job on the SAP system and can run on dynamic agent workstations, dynamic pools, and IBM Z Workload Scheduler Agent.

### SAP Job on Dynamic Workstations

For distributed systems only. This job definition can run on dynamic agent workstations, dynamic pools, and IBM Z Workload Scheduler Agent workstations.

### SAP Job on XA Workstations

This job definition can run on extended agent workstations, which are workstations hosted by fault-tolerant agents or master workstations.

7. Right-click the steps to move them and change their sequence.
8. The IBM Workload Scheduler job definition opens in Workload Designer. Some fields in the Properties pane already contain information relating to the associated SAP job. Specify the remaining properties using the tabs available. The tabs for each type of SAP job definition are similar, but there are some differences depending on the type of engine you selected and the type of workstation on which the job runs. For more detailed information about the UI elements on each tab, see the Dynamic Workload Console online help.
9. Click  to save the SAP job definition in the IBM Workload Scheduler database.

## Create an IBM Workload Scheduler job and associate it to an SAP job

Create an IBM Workload Scheduler job definition and map it to a new or existing SAP job to manage it.

### About this task

To create a new IBM Workload Scheduler job and then associate it to a new SAP job, follow these steps:

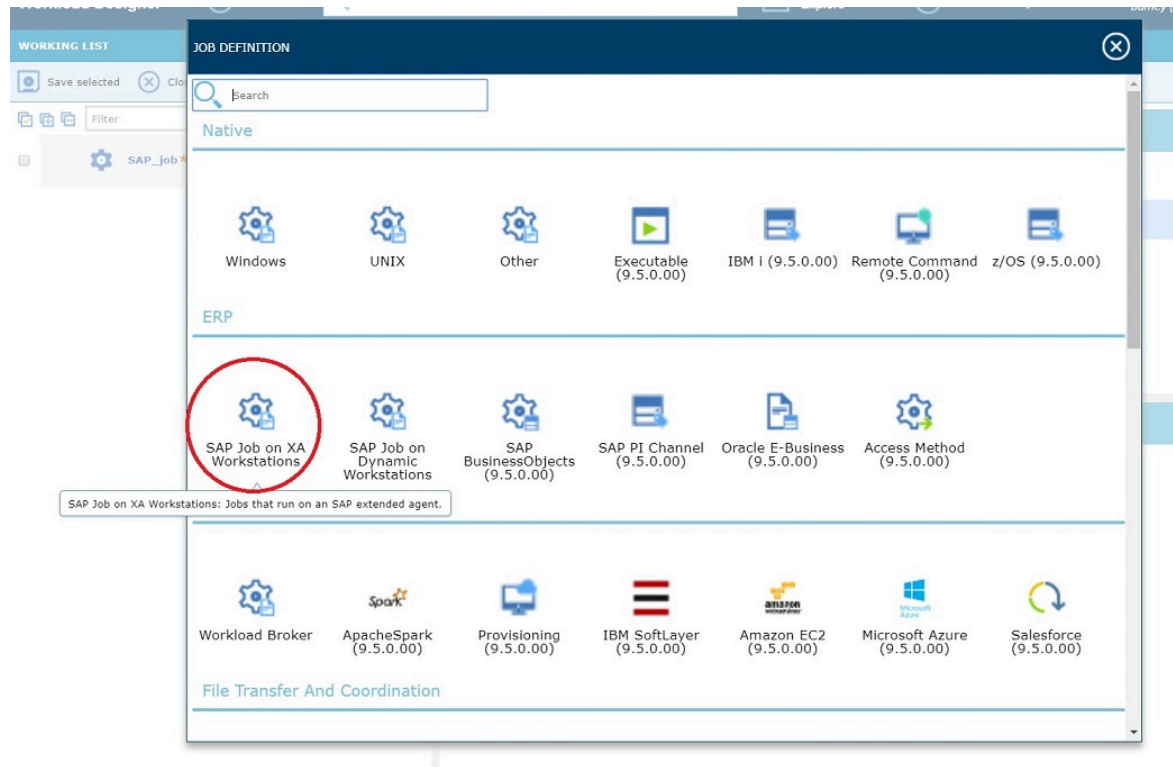
1. Click **Administration > Workload Design > Manage Workload Definitions**.
2. Select an engine. The Workload Designer window is displayed.
3. From the Working List pane,
  - Click: **New > Job Definition > ERP > SAP Job on....**, choosing the type of workstation on which it is going to run:

#### SAP Job on Dynamic Workstations

For distributed systems only. This job definition can run on dynamic agent workstations, dynamic pools, and IBM Z Workload Scheduler Agent workstations.

#### SAP Job on XA Workstations

This job definition can run on extended agent workstations, which are workstations hosted by fault-tolerant agents or master workstations.

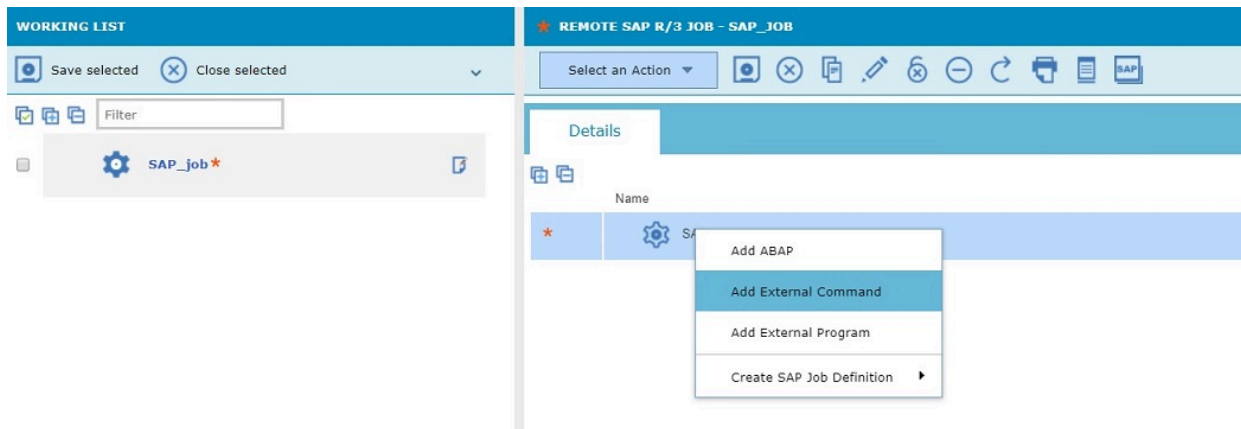



- Click: **New > ERP > SAP**

### SAP

For z/OS systems only. This job definition references an existing job on the SAP system and can run on dynamic agent workstations, dynamic pools, and IBM Z Workload Scheduler Agent.

- In the Properties pane, specify the properties for the SAP job definition you are creating using the tabs available. The tabs for each type of SAP job definition are similar, but there are some differences depending on the type of engine you selected and the type of workstation on which the job runs. For more detailed information about the UI elements on each tab, see the Dynamic Workload Console online help.
- In the Task tab, specify the IBM Workload Scheduler job that you want to associate to the SAP job. If this job already exists, specify it in the Job name field, otherwise, click **New** to create it from new and specify its properties in the Properties pane.
- In the Details view, right-click the new job to add ABAP, External command or External program steps to it. It is mandatory to add at least one job step to the job before you can save the job:



7. Save the job.
8. After you have saved the SAP job, close the SAP job definition view or select the IBM Workload Scheduler job definition to assign the SAP job to it.
9. In the Task pane, enter the details of the SAP job created before or use the picklist to retrieve the SAP job details from SAP
10. Click  to save the SAP job definition in the IBM Workload Scheduler database.

## Creating an SAP job from the Dynamic Workload Console

How to create an SAP job definition on a remote SAP system from the Dynamic Workload Console.

### About this task

You can also create and save SAP Standard R/3 jobs directly on the remote SAP system from IBM Workload Scheduler, as you would from the SAP graphical user interface. To create Standard R/3 jobs on the SAP system from the Dynamic Workload Console, perform the following steps:

1. Click **Administration > Workload Design > Manage Jobs on SAP**.
2. In the Filter, select **Standard R/3 Job** and specify the workstation name. This parameter is mandatory because it identifies the remote SAP system.
3. Specify the workstation where the SAP job runs. This is the workstation with the r3batch access method that communicates with the remote SAP system.
4. If the workstation is not an extended agent workstation, you must also specify the options file to be used.
5. Click **Display** to view a list of the Standard R/3 jobs for the specified workstation.
6. Click **New** to create a new Standard R/3 job and enter the required information in the **R/3 Job Definition** and **R/3 steps** tabs.
7. Click **OK** to save the job on the SAP system.

### What to do next

After creating the new SAP job on the SAP from the Dynamic Workload Console, you must reference it in an IBM Workload Scheduler SAP Standard R/3 job if you want to manage the job from within IBM Workload Scheduler as explained in [Create an IBM Workload Scheduler job and associate it to an SAP job on page 170](#).

## Setting the SAP data connection

You can configure a default connection to be used when performing actions that access the remote SAP system.


### About this task

There are several operations you can perform which require connection details to establish a link to a remote SAP system. The connection is made through an IBM Workload Scheduler workstation with the r3batch access method installed used to communicate with the SAP system. Each workstation can have one or more options files that can be used to customize the behavior of the r3batch access method, except for extended agent workstations, where only one options file can be defined and therefore a selection is not required.

For example, you can use **Workload Designer** to create IBM Workload Scheduler job definitions that reference remote SAP jobs, or you can create a SAP job on a remote SAP system. You can also search for SAP jobs on the remote system from the **Working List** and **Quick Open** panes.

**Workload Designer** enables you to configure a default connection that is automatically referenced when performing these types of operations. You can change the default configuration at any time, or you can overwrite the default configuration when performing these operations.

To configure a default SAP data connection to be used when creating objects with Workload Design that require a SAP connection, perform the following steps:

1. In the Workload Designer window, click  from the toolbar of the Details view.
2. In **Workstation**, enter the name of the workstation that communicates with the SAP system or use the pick tool to search for and select one.
3. In **Options file**, enter the options file to be used or use the pick tool to search for options files that reside on the specified workstation and select one.
4. Click **OK**.

### Results

A default SAP connection is now configured. It will be used each time an object that requires access to a SAP system is defined.

## Managing SAP variants using the Dynamic Workload Console

Managing variants using the Dynamic Workload Console.

### About this task

This section describes how to manage variants using the Dynamic Workload Console:

1. Click **Design > SAP > Manage Jobs on SAP** from the portfolio.
2. Specify an engine connection.
3. In **Workstation name**, type the name of the workstation where the SAP job runs. This is the workstation with the r3batch access method that communicates with the remote SAP system. If you do not know the name of the

workstation, click (...) browse to enter your filter criteria and click **Search**. If you enter a string representing part of the workstation name, it must be followed by the asterisk (\*) wildcard character. Both the question mark (?) and asterisk (\*) are supported as wildcards. You can also simply use the asterisk wildcard character (\*) to display all workstations. Optionally, specify any of the other search criteria available and click **Search**.

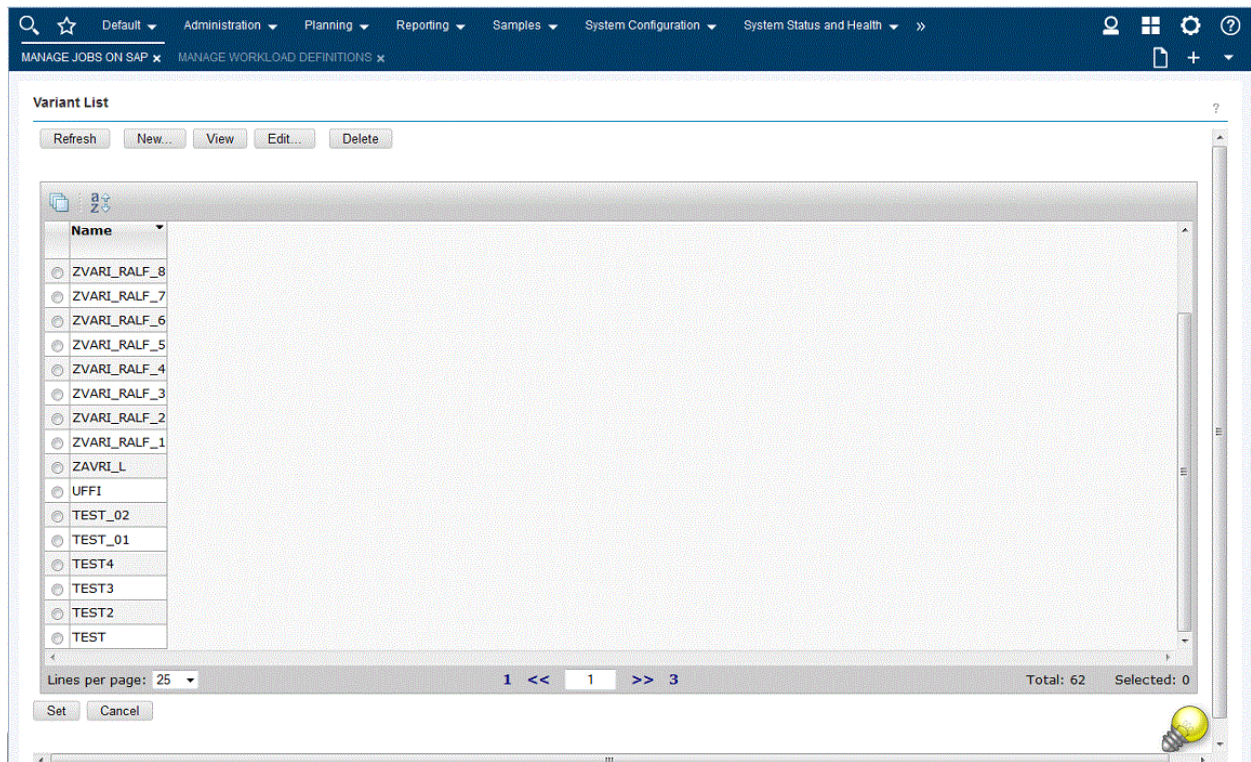
**Result**

From the results displayed, select the workstation and click **OK**.

4. In **Options file**, specify an options file that resides on the specified workstation. Each workstation can have one or more options files that can be used to customize the behavior of the r3batch access method, except for extended agent workstations, where only one options file can exist and therefore does not need to be specified. For the workstation specified, enter the file name of the options file or click the browse (...) button to search for options files that reside on the specified workstation and select one.
5. Click **Display**. The list of available jobs on the remote SAP system for the specified engine is displayed.
6. A list of SAP jobs on the remote SAP system are displayed.
7. Select a SAP job from the list and click **Edit**.
8. On the **SAP Steps** page, select a program of type ABAP from the list and click **Edit**. The properties for the ABAP program are displayed.
9. In the **Variant** field, click the ellipsis (...) icon to display the Variant List panel. This panel lists all the variants associated with the ABAP specified in the **Name** field.

**Result**

Figure 5. The Variant List panel



10. From this panel, you can take the following actions:

**Refresh**

To refresh the content of the variant list with the information contained in the SAP database.

**New**

To create a new variant as described in [Creating or editing a variant on page 175](#).

**View**

To display information on an existing variant.

**Edit**

To modify information on an existing variant as described in [Creating or editing a variant on page 175](#).

**Delete**

To delete a variant.

**Set**

To associate the value chosen from the list to the ABAP.

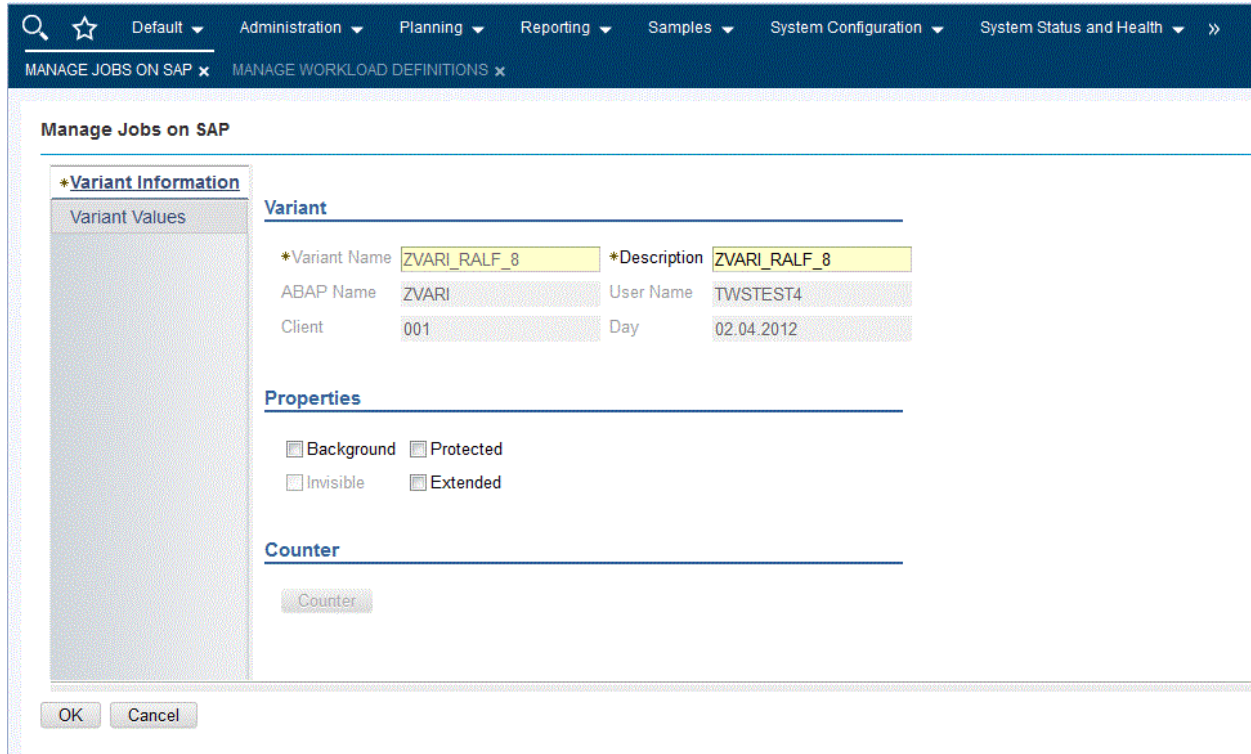
## Creating or editing a variant

**About this task**

You can create or edit a variant from the **Variant List** panel. To display the **Variant List** panel, see [Managing SAP variants using the Dynamic Workload Console on page 173](#).

1. In the Variant List panel, click **New** or **Edit**. The Variant Information page is displayed by default. If you are editing an existing variant, the fields and selections are not empty.

Figure 6. The Variant Information page of the Variant List panel



2. The panel consists of the following pages:

- Variant Information:
  - a. Enter or modify the variant name and description.
  - b. Optionally, check a **Properties** box:

**Background**

The variant can only be used in background processing.

**Protected**

The variant is protected against being changed by other users.

**Invisible**

The variant will not be displayed in the F4 value list on the SAP GUI. Not available for the BC-XBP 3.0 interface.

**Extended**

Allows for the use of placeholders and counters as variant values. If you check this box, **Counter** becomes available.

For extended variants, you can use placeholders and counters that eliminate the error-prone task of adjusting values and therefore minimize the effort for variant maintenance. Placeholders and counters



are preprocessed by IBM Workload Scheduler and the values are automatically adjusted when the job is launched. Supported placeholders and counters are:

**Table 32. Placeholders and counters for extended variants**

| Symbol                             | Meaning               | Syntax   |
|------------------------------------|-----------------------|--|
| \$\$                               | Timestamp             | YYYYMMDDHHMM   |
| \$D                                | Day of the month      | DD   |
| \$_D                               | Date                  | YYYYMMDD   |
| \$M                                | Month                 | MM   |
| \$Y                                | Year                  | YY   |
| \$_Y                               | Year                  | YYYY   |
| \$H                                | Hour                  | HH   |
| \$T                                | Minute                | MM   |
| \$_T                               | Time                  | HHMMSS   |
| \$Nx                               | Counters              | 10 counters: \$N0 - \$N9 (\$N = \$N0)  |
| \$( <i>date expression</i> )       | Date expression       | Like the <code>datecalc</code> command. Enclosed within \$( and ).                           |
| \$( <i>arithmetic expression</i> ) | Arithmetic expression | Arithmetic expressions allowing for +, -, *, and " operations between integers and counters. |

◦ Variant Values:

In the Variant Values page, the fields and values are dynamically built through `r3batch` depending on the characteristics of the variant or step and are identical to the ones in the equivalent SAP panel.

## Editing a standard SAP job

### Before you begin

You can edit SAP Standard R/3 jobs in two different ways in IBM Workload Scheduler.

- The Dynamic Workload Console contains the **Manage Jobs on SAP** entry in the portfolio for creating and editing SAP Standard R/3 jobs on remote SAP systems.
- From the Workload Designer you can create and edit remote SAP jobs. See [Creating SAP Standard R/3 jobs from the Dynamic Workload Console on page 167](#).

### About this task

To edit a SAP standard R/3 job, follow these steps:

1. Click **Design > SAP > Manage Jobs on SAP**.
2. Select the name of the engine connection from which you want to work with SAP jobs.
3. Leave the default setting in the **SAP Job Type** section to **Standard R/3 Job**.
4. In **Workstation name**, type the name of the workstation where the SAP job runs. This is the workstation with the r3batch access method that communicates with the remote SAP system. If you do not know the name of the workstation, click (...) browse to enter your filter criteria and click **Search**. If you enter a string representing part of the workstation name, it must be followed by the asterisk (\*) wildcard character. Both the question mark (?) and asterisk (\*) are supported as wildcards. You can also simply use the asterisk wildcard character (\*) to display all workstations. Optionally, specify any of the other search criteria available and click **Search**.

#### Result

From the results displayed, select the workstation and click **OK**.

5. In **Options file**, specify an options file that resides on the specified workstation. Each workstation can have one or more options files that can be used to customize the behavior of the r3batch access method, except for extended agent workstations, where only one options file can exist and therefore does not need to be specified. For the workstation specified, enter the file name of the options file or click the browse (...) button to search for options files that reside on the specified workstation and select one.
6. Click **Display**. The list of available jobs on the remote SAP system for the specified engine is displayed.
7. Select the job you want to modify in the list and click **Edit**. The **List Jobs on SAP** panel is displayed.
8. Edit the properties on the **R/3 Job Definition** and **R/3 Steps** pages as appropriate. Refer to the contextual online help available for more detailed information about the UI elements available on each page.



#### Note:

- On the **R/3 Job Definition** page, when you modify the **Job Class**, **Target Host**, or **Server Group** and click **OK**, the **Job ID** is maintained and remains synchronized with the one associated to the current job. Instead, when you modify the **Job Name** and click **OK**, the **Job ID** is automatically replaced with the one associated to the new job name.
- On the **R/3 Steps** page, for each step you modify, the new step information is saved in the SAP database. For each step you add or delete, the **Job ID** is maintained and remains synchronized with the one associated to the modified step.

9. Click **OK** to save your changes.

## Task string to define SAP jobs

This section describes the task string parameters that define and control the running of SAP jobs. You can specify them in the following places when you define their associated IBM Workload Scheduler jobs:

- In the **SAP Command Line** section of the Task page of the Submit Ad Hoc Jobs action from the Dynamic Workload Console.
- In the **SAP Command Line** field of the More Options page of the SAP job definition, if you use the Dynamic Workload Console and selected a **SAP** job definition.

- As arguments of the `scriptname` keyword in the job definition statement, if you use the IBM Workload Scheduler command line.
- As arguments of the `JOB_CMD` keyword in the `JOBREC` statement in the `SCRIPTLIB` of IBM Z Workload Scheduler, if you are scheduling in an end-to-end environment. The following is an example of a `JOBREC` statement:

```
JOBREC
JOB_CMD('/-job job_name -user user_name -i job_ID -c class_value')
JOBUSR(TWS_user_name)
```

where:

#### ***class\_value***

The priority with which the job runs in the SAP system. For details, see [Table 33: Task string parameters for SAP jobs on page 180](#).

#### ***job\_ID***

The unique SAP job ID. For details, see [Table 33: Task string parameters for SAP jobs on page 180](#).

#### ***job\_name***

The name of the SAP job to run. For details, see [Table 33: Task string parameters for SAP jobs on page 180](#).

#### ***user\_name***

The SAP user who owns the target job. For details, see [Table 33: Task string parameters for SAP jobs on page 180](#).

#### ***TWS\_user\_name***

The IBM Z Workload Scheduler user who runs the `r3batch` access method from the end-to-end scheduling environment.

The string syntax is the following:

### **Job definition syntax**

```
-job job_name [{ -i | -id } job_ID] [ -user user_name ] [ { -host | -ts } host_name ] [ -sg server_group ]
[ -client source_client ] [ -exec_client target_client ] [ -rfc_client rfc_logon_client ] [ -c class_value ] [
-bdc_job_status_failed bdc_processing ] [ { -nobdc | -nobdcwait } ] [ -bapi_sync_level { high | medium | low } ] [
-s starting_step_number ] [ -s Step_number attribute_name [ =attribute_value ] ] [ -v Step_number variant_name ]
[ -vtxt Step_number variant_description ] [ -vpar Step_number name=variant_value ] [ -vsel Step_number name= { i |
e } #operation#lowest [ #highest ] ] [ -vtemp Step_number ] [ -recipient R/3_login_name ] [ -rectype recipient_type ]
[ -flag { reccp | recbl } ] [ -flag recex ] [ -flag recnf ] [ -flag { im | immed } ] [ -flag { enable_applinfo |
disable_applinfo } ] [ -flag { enable_appl_rc | disable_appl_rc } ] [ -flag { enable_joblog | disable_joblog } ] [
-flag { enable_job_interceptable | disable_job_interceptable } ] [ -flag { enable_spoolist | disable_spoolist } ] [
-flag pc_launch ] [ { -debug } ] [ -tracelvl { 1 | 2 | 3 } ] [ { -rfctrace } ]
```

[Table 33: Task string parameters for SAP jobs on page 180](#) describes the parameters for the task string to define SAP jobs.

**Note:**

1. You can specify both `-i` or `-id` and `-user` in the same job definition, but the user name is ignored.
2. When you specify the job ID, both `-client` and `-exec_client` are ignored because the ID is unique for the entire SAP system.
3. Typically, the `-debug` and `-trace` options are for debugging the extended agent and should not be used in standard production.

**Table 33. Task string parameters for SAP jobs**

| Section                       | Parameters   | Description   | GUI Support |
|-------------------------------|--|---|-------------|
| JOB                           | <code>-job job_name</code>   | The name of the job to run. This parameter is mandatory.  | ✓           |
|                               | <code>-i job_ID</code>   | The unique SAP job ID. Specify this parameter if you are submitting a job that refers to a predefined job template stored in the SAP database for which you want to change a parameter.   | ✓           |
|                               | <code>-id job_ID</code>  |   |             |
|                               | <code>-user user_name</code>   | The SAP user who owns the target job. Use this parameter when the target SAP system has only one job with the specified name for the specified user. This parameter has no effect if a job ID is specified in the job definition.   | ✓           |
|                               | <code>-host host_name</code><br><code>-ts host_name</code>   | The name of the SAP workstation where the job is to be run. <i>host_name</i> has the format <i>hostname_SAPsystemname_SAPsystemnumber</i> .<br><br>For example, the name of a host might be <i>amss80a0_gs7_90</i><br><br>These parameters are mutually exclusive with <code>-sg</code> . | ✓           |
| <code>-sg server_group</code> | The name of the SAP server group where the job is to be run. Use this parameter to run the job on an application server that belongs to the group. The server group must exist on the SAP system, otherwise an error code is returned and the job is not launched.<br><br>This parameter is case-sensitive and can be up to 20 characters. It is mutually exclusive with <code>-host</code> and <code>-ts</code> . | ✓   |             |

Table 33. Task string parameters for SAP jobs

(continued)

| Section | Parameters                                   | Description  | GUI Support |
|---------|--|--|-------------|
| JOB     | -client <i>source_client</i>                 | The number that identifies the SAP client where the job definition is to be found, regardless of the client number defined by the <code>r3client</code> keyword in the options file. This parameter has no effect if a job ID is specified in the job definition.  |             |
|         | -exec_client <i>target_client</i>            | The number that identifies the SAP client where the job is to be run, regardless of the client number defined by the <code>r3client</code> keyword in the options file. This parameter has no effect if a job ID is specified in the job definition.   |             |
|         | -rfc_client <i>rfc_logon_client</i>          | The number that identifies the SAP client to be used for RFC logon. This value overwrites the value specified by the <code>r3client</code> keyword in the corresponding <code>r3batch</code> options file.   |             |
|         | -c <i>class_value</i>                        | The priority with which the job runs in the SAP system.<br>Possible values are:<br><b>A</b><br>High priority<br><b>B</b><br>Medium priority<br><b>C</b><br>Low priority. This is the default value.  | ✓           |
|         | -bdc_job_status_failed <i>bdc_processing</i> | How IBM Workload Scheduler sets the completion status of a job running BDC sessions, according to a possible BDC processing failure. The allowed values are:<br><b>n</b><br>If at least <i>n</i> BDC sessions failed (where <i>n</i> is an integer greater than 0), IBM Workload Scheduler sets the job completion status as failed. | ✓           |

Table 33. Task string parameters for SAP jobs

(continued)

| Section | Parameters   | Description  | GUI Support |
|---------|--|--|-------------|
|         |  | <b>all</b><br>If all the BDC sessions failed, IBM Workload Scheduler sets the job completion status as failed.   |             |
|         |  | <b>ignore</b><br>When all the BDC sessions complete, regardless of their status, IBM Workload Scheduler sets the job completion status as successful. This is the default.<br><br>If <b>-nobdc</b> or <b>-nobdcwait</b> is set, this option is ignored.  |             |
|         | -nobdc<br>-nobdcwait   | Disables the BDC Wait option (enabled by default) to have the job considered as completed even if not all its BDC sessions have ended.   | ✓           |
|         | -bapi_sync_level   | Specifies the synchronization level between the SAP function modules BAPI_XBP_JOB_COPY and BAPI_XBP_JOB_START_ASAP. Allowed values are:<br><br><b>high</b><br>All RFC calls between BAPI_XBP_JOB_START_ASAP and BAPI_XBP_JOB_COPY are synchronized. This is the default.<br><br><b>medium</b><br>The RFC calls to BAPI_XBP_JOB_START_ASAP are synchronized.<br><br><b>low</b><br>The RFC calls are not synchronized. |             |
| STEP    | -s <i>starting_step_number</i>                                 | The number of the starting step.   | ✓           |
|         | -s <i>Step_number</i><br><i>attribute_name=attribute_value</i> | The step number and its attributes, where:   | ✓           |

Table 33. Task string parameters for SAP jobs

(continued)

| Section | Parameters   | Description  | GUI Support |
|---------|--|--|-------------|
|         |  | <p><b><i>step_number</i></b></p> <p>The number of the step being defined. Each step is identified by a sequential number (1, 2, 3, ...<i>n</i>) using the <i>step number</i></p> <p><b><i>attribute_name</i></b></p> <p>The name of the attribute.</p> <p><b><i>attribute_value</i></b></p> <p>The value of the attribute. It is optional for some attributes.</p> <p>Attributes can be defined in any order, but cannot be repeated for the same step. Attribute validation is performed before the job is created in the SAP system. If the validation fails, the IBM Workload Scheduler job goes into the ABEND state. For a detailed description of each attribute and its value, see <a href="#">Defining attributes for ABAP steps on page 207</a> and <a href="#">Defining attributes for external programs and external commands steps on page 211</a>.</p> <p>For example, the following step (step 8) is an ABAP module running the report MYPGM and has two attributes, only one of which has a value.</p> <pre>-s8 type=A -s8 program=MYPGM -s8 pr_cover="My title" -s8 pr_immed</pre> |             |
| VARIANT | <i>-vstep_number</i> name                          | The variant name for the specified step number.  | ✓           |
|         | <i>-vtxtstep_number</i> <i>variant_description</i> | The textual description of the variant, in the IBM Workload Scheduler logon language (customizable with the <code>TWSXA_LANG</code> option of <code>r3batch</code> ). The maximum length is 30 characters.   | ✓           |
|         | <i>-vparstep_number</i> name= <i>value</i>         | For ABAP modules only. The value for a variant parameter for the specified step number. This parameter is mandatory when creating a new variant. See <a href="#">Defining attributes for ABAP steps on page 207</a> for a complete list of the supported attributes for ABAP steps.  | ✓           |

**Table 33. Task string parameters for SAP jobs**

(continued)

| Section | Parameters   | Description  | GUI Support |
|---------|--|--|-------------|
|         | -vselstep_number<br>name=sign#operation#lowest[#highest] | For ABAP modules only. The value for a variant selection option for the specified step number. | ✓           |
|         |  | <b>sign</b>  |             |
|         |  | Sign of the operation. Possible values are:  |             |
|         |  | <b>I</b>   |             |
|         |  | Include  |             |
|         |  | <b>E</b>   |             |
|         |  | Exclude  |             |
|         |  | <b>operation</b>   |             |
|         |  | Possible values are:   |             |
|         |  | <b>EQ</b>  |             |
|         |  | Equals   |             |
|         |  | <b>NE</b>  |             |
|         |  | Not equal to   |             |
|         |  | <b>BT</b>  |             |
|         |  | Between  |             |
|         |  | <b>NB</b>  |             |
|         |  | Not between  |             |
|         |  | <b>LT</b>  |             |
|         |  | Less than  |             |
|         |  | <b>LE</b>  |             |
|         |  | Less than or equal to  |             |
|         |  | <b>GT</b>  |             |
|         |  | Greater than   |             |
|         |  | <b>GE</b>  |             |
|         |  | Greater than or equal to   |             |
|         |  | <b>CP</b>  |             |
|         |  | Contains pattern   |             |



Table 33. Task string parameters for SAP jobs

(continued)

| Section | Parameters                 | Description   | GUI Support |
|---------|----------------------------|---|-------------|
|         |                            | <b>NP</b>   |             |
|         |                            | Does not contain pattern  |             |
|         |                            | <b>lowest</b>   |             |
|         |                            | Low value of the selection. You can use up to 45 characters.  |             |
|         |                            | <b>highest</b>  |             |
|         |                            | High value of the selection. You can use up to 45 characters. This attribute is optional.   |             |
|         |                            | For a complete list of the supported attributes for ABAP steps, see <a href="#">Defining attributes for ABAP steps on page 207</a> .  |             |
|         | <i>-vtempstep_number</i>   | For ABAP modules only. Specifies to assign a temporary variant to the specified step number. Temporary variants are created ad-hoc by the SAP system and assigned to the job instance when it is run. The lifecycle of the temporary variant is determined by the SAP system. If the job is deleted by SAP, then the temporary variant is deleted. See <a href="#">Examples: Dynamically defining and updating SAP jobs on page 213</a> to refer to examples that demonstrate the behavior of temporary variants. |             |
| SPOOL   | <i>-recipient name</i>     | The login name of an SAP user.  |             |
|         | <i>-flag {reccp recbl}</i> | Specifies how the spool list is sent to the recipient.<br>Possible values are:  |             |
|         |                            | <b>reccp</b>  |             |
|         |                            | The spool list is sent as a copy.   |             |
|         |                            | <b>recbl</b>  |             |
|         |                            | The spool list is sent as a blind copy.   |             |
|         | <i>-flag recex</i>         | Specifies that the spool list is sent as an express message to the recipient.   |             |
|         | <i>-flag recnf</i>         | Specifies that the recipient is not allowed to forward the spool list.  |             |

**Table 33. Task string parameters for SAP jobs**

(continued)

| Section | Parameters    | Description  | GUI Support |
|---------|---------------|--|-------------|
|         | -rectype type | Specifies the recipient type. Possible values are: |             |
|         |               | ''   |             |
|         |               | SAP user (default value)                           |             |
|         |               | 'B'  |             |
|         |               | SAP user   |             |
|         |               | 'C'  |             |
|         |               | Shared distribution list                           |             |
|         |               | 'D'  |             |
|         |               | X.500 address                                      |             |
|         |               | 'G'  |             |
|         |               | Organization object/ID                             |             |
|         |               | 'H'  |             |
|         |               | Organization unit                                  |             |
|         |               | 'I'  |             |
|         |               | SAP object   |             |
|         |               | 'L'  |             |
|         |               | Telex number                                       |             |
|         |               | 'O'  |             |
|         |               | SAPoffice user                                     |             |
|         |               | 'P'  |             |
|         |               | Private distribution list                          |             |
|         |               | 'R'  |             |
|         |               | SAP user in another SAP system                     |             |
|         |               | 'U'  |             |
|         |               | Internet address                                   |             |
|         |               | '1'  |             |
|         |               | Other recipient type                               |             |


Table 33. Task string parameters for SAP jobs

(continued)

| Section | Parameters  | Description   | GUI Support |
|---------|---|---|-------------|
| FLAGS   | -flag im<br>-flag immed   | Specifies to launch job immediately, meaning that if there are no spare work processes, the job fails.  | ✓           |
|         | -flag enable_applinfo<br>-flag disable_applinfo                   | Enables or disables the retrieval and appending of the SAP application log to the stdlist of IBM Workload Scheduler.  | ✓           |
|         | -flag enable_appl_rc<br>-flag disable_appl_rc                     | Enables or disables the mapping of the SAP application return code to the IBM Workload Scheduler return code.<br><br>The SAP application return code is mapped only if <b>-flag enable_applinfo</b> is set and the application log contains the application return code.  |             |
|         | -flag enable_joblog<br>-flag disable_joblog                       | Enables or disables retrieval of the joblog.  | ✓           |
|         | -flag enable_job_interceptable<br>-flag disable_job_interceptable | Enables or disables the job launched by r3batch to be intercepted by SAP. If enabled, when r3batch launches a job and the SAP job interception feature is enabled, the job can be intercepted if it matches previously defined criteria. If disabled, the job launched by r3batch cannot be intercepted by SAP. This setting overwrites the setting in the common options file. | ✓           |
|         | -flag enable_spoollist<br>-flag disable_spoollist                 | Enables or disables retrieval of the spool lists of the job.  | ✓           |
|         | -flag pc_launch   | Specifies to launch child jobs that are in scheduled state.<br><br><b>ON</b><br><br>The product launches child jobs that are in scheduled state.<br><br><b>OFF</b><br><br>The product does not launch child jobs that are   |             |

**Table 33. Task string parameters for SAP jobs**

(continued)

| Section | Parameters  | Description   | GUI Support |
|---------|---|---|-------------|
|         | in scheduled state. This is the default value.  |   |             |
|         |  <b>Note:</b> You can use this option only if you activated the parent-child feature on the SAP system. On the XBP 2.0 (or later)SAP system you can activate this feature using the INITXBP2 ABAP report |   |             |
| TRACING | -debug  | Enables maximum trace level.  | ✓           |
|         | -tracelvl 1 2 3   | Specifies the trace setting for the job. Possible values are: <ol style="list-style-type: none"> <li><b>1</b><br/>Only error messages are written in the trace file. This is the default.</li> <li><b>2</b><br/>Informational messages and warnings are also written in the trace file.</li> <li><b>3</b><br/>A most verbose debug output is written in the trace file.</li> </ol> For detailed information, refer to <a href="#">Configuring the tracing utility on page 118</a> . | ✓           |
|         | -rfctrace   | Enables RFC trace.  |             |
|         | -trace  |   |             |

The following is an example for an SAP job named `BVTTEST` with ID `03102401` and user `myuser`:

```
-job BVTTEST -i 03102401 -user myuser -debug
```

## Managing SAP jobs

This section describes how to manage SAP jobs.

### Displaying details about a standard SAP job

#### About this task

Perform the following steps to display details for standard jobs on specific workstations.

For information about how to display details about a job that submits an SAP process chain, refer to [Displaying details about a process chain job on page 237](#).

1. Click **Design > SAP > Manage Jobs on SAP**.
2. In **Engine name**, select the name of the IBM Workload Scheduler engine connection from which you want to view SAP job details.
3. In **Workstation name**, type the name of the workstation where the SAP job runs. This is the workstation with the r3batch access method that communicates with the remote SAP system. If you do not know the name of the workstation, click (...) browse to enter your filter criteria and click **Search**. If you enter a string representing part of the workstation name, it must be followed by the asterisk (\*) wildcard character. Both the question mark (?) and asterisk (\*) are supported as wildcards. You can also simply use the asterisk wildcard character (\*) to display all workstations. Optionally, specify any of the other search criteria available and click **Search**.

#### Result

From the results displayed, select the workstation and click **OK**.

4. In **Options file**, specify an options file that resides on the specified workstation. Each workstation can have one or more options files that can be used to customize the behavior of the r3batch access method, except for extended agent workstations, where only one options file can exist and therefore does not need to be specified. For the workstation specified, enter the file name of the options file or click the browse (...) button to search for options files that reside on the specified workstation and select one.
5. Click **Display**. The list of available jobs for the specified engine is displayed.
6. Select the job for which you want to display the details and click **Details**. The List Jobs on SAP panel is displayed containing job and time information.
7. When you have finished viewing the details for the job, click **OK** to return to the list of SAP jobs on the workstation specified.

### Verifying the status of a standard SAP job

#### About this task

To verify the status of a standard SAP job, perform the following steps:

1. Click **Design > SAP > Manage Jobs on SAP**.
2. In **Engine name**, select the name of the IBM Workload Scheduler engine connection from which you want to verify the status of an SAP job.

3. In **Workstation name**, type the name of the workstation where the SAP job runs. This is the workstation with the r3batch access method that communicates with the remote SAP system. If you do not know the name of the workstation, click (...) browse to enter your filter criteria and click **Search**. If you enter a string representing part of the workstation name, it must be followed by the asterisk (\*) wildcard character. Both the question mark (?) and asterisk (\*) are supported as wildcards. You can also simply use the asterisk wildcard character (\*) to display all workstations. Optionally, specify any of the other search criteria available and click **Search**.

#### Result

From the results displayed, select the workstation and click **OK**.

4. In **Options file**, specify an options file that resides on the specified workstation. Each workstation can have one or more options files that can be used to customize the behavior of the r3batch access method, except for extended agent workstations, where only one options file can exist and therefore does not need to be specified. For the workstation specified, enter the file name of the options file or click the browse (...) button to search for options files that reside on the specified workstation and select one.
5. Click **Display**. The list of available jobs for the specified engine is displayed.
6. Select the job for which you want to verify the status and click **Status**. The current status for the SAP job is displayed, as well as the database name where the job is installed.
7. When you have finished verifying the status for the job, click **OK** to return to the list of SAP jobs on the workstation specified.

## Deleting a standard SAP job from the SAP database

### About this task

To delete a standard SAP job from the SAP database, perform the following steps:

1. Click **Design > SAP > Manage Jobs on SAP**.
2. In **Engine name**, select the name of the IBM Workload Scheduler engine connection from which you want to delete the SAP job.
3. In **Workstation name**, type the name of the workstation where the SAP job runs. This is the workstation with the r3batch access method that communicates with the remote SAP system. If you do not know the name of the workstation, click (...) browse to enter your filter criteria and click **Search**. If you enter a string representing part of the workstation name, it must be followed by the asterisk (\*) wildcard character. Both the question mark (?) and asterisk (\*) are supported as wildcards. You can also simply use the asterisk wildcard character (\*) to display all workstations. Optionally, specify any of the other search criteria available and click **Search**.

#### Result

From the results displayed, select the workstation and click **OK**.

4. In **Options file**, specify an options file that resides on the specified workstation. Each workstation can have one or more options files that can be used to customize the behavior of the r3batch access method, except for extended agent workstations, where only one options file can exist and therefore does not need to be specified. For the workstation specified, enter the file name of the options file or click the browse (...) button to search for options files that reside on the specified workstation and select one.
5. Click **Display**. The list of available jobs for the specified engine is displayed.

6. Select the job or jobs you want to delete and click **Delete**. A confirmation message prompts you to confirm the delete action.
7. When the delete action is complete, click **OK** to return to the list of SAP jobs on the workstation specified.

## Balancing SAP workload using server groups

SAP jobs run on application servers that host work processes of type *batch*. Critical batch jobs are run in specific time frames, on specific application servers. With SAP Basis version 6.10 and later, application servers can be assigned to server groups. With IBM Workload Scheduler you can assign a server group to a job. In this way, when a job is launched, the SAP system runs it on an application server that belongs to that group, balancing the workload among the various application servers in the group.

If the application servers defined in a group are modified in the SAP system, the job defined as belonging to that server group is not affected and does not need to be modified. The batch execution targets are reorganized in the SAP system without having to change job definitions in IBM Workload Scheduler.

This function is supported with the following versions of SAP:

- SAP Basis 6.10, with Service Pack 40
- SAP Basis 6.20, with Service Pack 41
- SAP Basis 6.40, with Service Pack 04
- SAP Basis 7.00, and later

## Mapping between IBM Workload Scheduler and SAP job states

When an SAP job is launched by IBM Workload Scheduler, you can monitor its progress. The status transitions in IBM Workload Scheduler (internal status) and the corresponding SAP status are listed in [Table 34: Status transitions in IBM Workload Scheduler \(internal status\) and the corresponding SAP R/3 status on page 191](#).

**Table 34. Status transitions in IBM Workload Scheduler (internal status) and the corresponding SAP R/3 status**

| IBM Workload Scheduler Job State | SAP Job State  |
|----------------------------------|----------------|
| INTRO                            | Not Available  |
| WAIT                             | Ready, Release |
| EXEC                             | Active         |
| SUCC                             | Finished       |
| ABEND                            | Canceled       |

The INTRO state indicates that IBM Workload Scheduler is in the process of introducing the job, but in SAP, the job has not yet entered the ready state. Because it takes some time to get a job queued and into the ready column, the INTRO state might last a few minutes if the SAP system is particularly busy.

Even if a job is finished in SAP, IBM Workload Scheduler keeps it in the EXEC state if its BDC sessions are not complete and you have not selected the **Disable BDC Wait** option. For details about this option, see [Using the BDC Wait option on page 218](#).

## Managing spools

Browse spool lists on request without having to download the entire spool which can occupy significant space on the file system.

Spool lists can be very large so rather than download them as part of a job run, you can request to browse the spool list, chunks at a time, even if you have disabled the option, `retrieve_spoollist`, to append the spool list to the IBM Workload Scheduler joblog.

From the Dynamic Workload Console, you can list the spool data available for SAP Standard R/3 jobs that have run. Each spool is identified by the following information:

- The spool number.
- The related step number.
- The name of the spool request.
- The title of the spool request.
- The total number of pages for the spool information.
- The user who executed the SAP job related to the spool.
- The date the spool was created based on the Coordinated Universal Time (UTC) time standard.
- The client for which the spool was created.

## Browsing spool data

You can list the spool data available for SAP Standard R/3 jobs that have run and browse the contents of the spool.

### About this task

To browse spool data for a specific job that has run:

1. From the **Monitoring and Reporting** menu, click **Monitor Workload**.
2. In the **Monitor Workload** input fields enter the engine name, the plan, and any filtering data that helps you filter the selection of jobs (you can also select **Edit** for a guided selection of filtering criteria) and select **Run**.
3. In the output table select an SAP Standard R/3 job and click **More Actions > Show Spool List**. The list of spool data available for the selected job is displayed.
4. Select a spool and click **Spool**.

### Results

By default, the first ten pages of the spool are made available. You can change this default by editing the number of pages specified in **Pages for screen**. Use the page functions to jump to a specific page number, jump to the last page of the spool, jump to the first page of the spool, or move forward or back through the number of pages indicated by **Pages for screen**.



## Killing an SAP job instance

### About this task

This section describes how to kill an IBM Workload Scheduler job that submits either a standard SAP job or an SAP process chain.

To kill an SAP job instance, do the following:

The IBM Workload Scheduler job status is set to ABEND. The SAP job or process chain is set to canceled in the SAP system.



**Note:** If you kill a process chain job, the SAP system stops as soon as the process that is currently running completes.

1. Use the **Monitor Workload** query of the Dynamic Workload Console to display a list of defined job instances containing the job you want to kill. From the **Monitoring and Reporting** menu, click **Monitor Workload**.
2. In the **Monitor Workload** input fields enter the engine name, the plan, and any filtering data that helps you filter the selection of jobs (you can also select **Edit** for a guided selection of filtering criteria) and select **Run**.
3. The **Monitor Jobs** panel is displayed. Select the job instance you want to kill and click **More Actions > Kill**.

## Raising an SAP event

### About this task

You can raise events on XBP 2.0 (or later) SAP jobs in the IBM Workload Scheduler database in one of the following ways:

#### Using the Monitor Workload in the Dynamic Workload Console

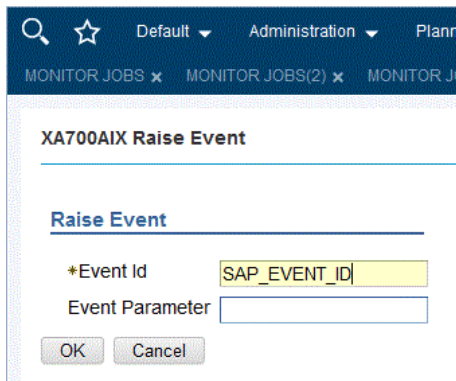
Perform the following steps:

1. On the SAP system, create a job that has as start condition a SAP event. When you create this job, its status is released.
2. Check that this job was not intercepted by the interception function.
3. Log in to the Dynamic Workload Console.
4. From the **Monitoring and Reporting** menu, click **Monitor Workload**.
5. In the Monitor Workload window select the engine, enter **Workstation** in the Object Type field, and select the plan to display the list of workstations you want to monitor. Click **Run**.

A list of workstations is displayed.

6. Select a workstation that has been defined to connect to a remote SAP system.
7. From the toolbar, select **More Actions > Raise Event**. The Raise Event panel opens.

Figure 8. The Raise Event panel



8. The panel consists of the following:

**Event ID**

The identifier of the event that is to be raised.

**SAP Event Parameter**

The parameter of the event that is to be raised.

9. Click **OK**. The event is raised.

**Creating a job that launches a Windows™ or UNIX™ command that raises an event**

Do the following:

1. In the Dynamic Workload Console, select **Design > Workload Design > Manage Workload Definitions**.
2. Specify an engine name, either distributed or z/OS. The Workload Designer window opens. Job types and characteristics vary depending on whether you select a distributed or a z/OS engine.
3. In the Working List pane, select **New > Job Definition**.
4. Select the **Native** category and then either **Windows** or **UNIX**.
5. Use the **General** page to provide general information about the new job definition.
6. Use the **Task** page to provide task information for the job.
7. In the **Task** page, select **Command** and in the command string type the following command that raises the event:

```
<data_dir>/methods/r3event -c workstation_name -u user_name
-e SAP_event_ID -p parameter
```

where:

**workstation\_name**

The name of the workstation where the SAP job is defined.

**user\_name**

The name of the SAP user with which the access method connects to the SAP system.  
This is the name specified in the r3user option.

**SAP\_event\_ID**

The identifier of the event.

**parameter**

The parameter defined for the event.

8. Save the job definition.

**What to do next**

See [Defining conditions and criteria on page 214](#) for information about how to define criteria that manages which raised events to log.

## Rerunning a standard SAP job

You can rerun a standard SAP job from the start, or from a specific numeric step of the SAP instruction.

**About this task**

To rerun a standard SAP job, you can use one of the following user interfaces:

**conman**

For details, refer to the *IBM Workload Scheduler: User's Guide and Reference*.

**Dynamic Workload Console**

Dynamic Workload Console

For details about how to rerun a job that submits an SAP process chain, refer to [Rerunning a process chain job on page 239](#).

For an SAP extended agent, a `step` is the numeric step of the SAP instruction from which a job can be restarted. Before you rerun an SAP job with IBM Workload Scheduler, you have the option of providing a step name for the job. This affects `r3batch` in the following ways:

- If you use a step name that is up to 9 digits (or 8 digits preceded by a character) in length, this name is used as the starting step number for the rerunning job.
- If you use any different format, the name is ignored and the job is rerun starting from the first step.

For example, to rerun a job from the third step, you can use: `A03, 3, 00003`, or `H3`.

In z/OS environments, you need to set the status of the job to **Ready** before you can rerun the job.



**Note:** By default, if you specify a job step to rerun, the new job is assigned the name of the step you indicated. To keep the original job name, set the IBM Workload Scheduler global option **enRetainNameOnRerunFrom** to `yes`. This option works only when used with the following arguments: `rr jobselect;from=[wkstat#]job`. For details about these



arguments, see *IBM Workload Scheduler: User's Guide and Reference, Managing objects in the plan - conman, Conman commands, rerun*. For details about this option, see *IBM Workload Scheduler: Planning and Installation*.

When `r3batch` reruns a job from its first step, either because you specified it as the starting step or because no starting step was specified, it uses the `new copy` feature, if applicable. If the starting step is greater than one, `r3batch` uses the `old copy` to rerun the job. For a description about the difference between the new and old copy of a rerunning job, refer to [Old copy and new copy of a rerunning job on page 196](#).

To rerun a SAP Standard R/3 job from the Dynamic Workload Console, perform the following steps:

1. In the Dynamic Workload Console select **Monitoring & Reporting > Workload Monitoring > Monitor Workload**.
2. In the Monitor Workload input fields select **Job** as the Object Type, the engine name, the plan, and any filtering data that helps you filter the selection of jobs (you can also select **Edit** for a guided selection of filtering criteria) and select **Run**.
3. A list of jobs is displayed. Select an SAP Standard R/3 job.
4. Rerun the job.

#### Distributed environment

- a. Click **Rerun...** The General properties for the rerun operation are displayed.
- b. Optionally, you can choose to not rerun the same job but instead, substitute the selected SAP job with a different job definition and run it. Type the job definition name in the **From Job Definition** field, or use the browse button to search for it and select it.
- c. Optionally, type the workstation name of the workstation on which you want to rerun the job in the **Workstation Name** field.
- d. Optionally, in **Step**, enter a specific numeric step of the SAP instruction from which you want to rerun the job rather than rerunning the whole job.
- e. Optionally, specify the start and finish time for the job.
- f. Click **Rerun**.

The job reruns immediately or at the specified start time.

#### z/OS environment

In a z/OS environment, an alias for the job name is not required so the job reruns with the same name. The list of jobs always reports the latest action performed on the job.

- a. Before you can rerun a job, you must change the status of the job to **Ready**. Select a job and click **Set Status**.
- b. In **Change Status**, select **Ready**.
- c. Click **OK** to return to the list of jobs.

The job reruns immediately and the internal status reports **Started**.

## Old copy and new copy of a rerunning job

When the access method for SAP launches a job, it makes a copy of a template job and runs it.

The `new copy` feature is available for SAP versions 3.1i, and later. It copies an entire job, preserving steps, job class, and all print and archive parameters. It is performed by using a new SAP function module that is part of the SAP Support Package as stated in the SAP Notes 399449 and 430087.

The `old copy` feature, instead, is based on standard SAP function modules, and creates a new SAP job and adds the steps with a loop that starts from the step name or number you specified. Be aware that, unless you have XBP 2.0 or later:

- The `old copy` does not preserve all the print and archive parameters.
- The job class of the copy is always set to class `c`.

Refer to [Print parameter and job class issues on page 140](#) to learn how to resolve the problem of lost job class and print and archive parameters.

SAP Note 758829 is required to ensure correct operation of the `new copy` and `old copy` features. See also [Table 58: Miscellaneous troubleshooting items on page 289](#).

## Defining SAP jobs dynamically

This section describes how to create and submit SAP jobs dynamically without creating or referencing predefined job templates.

When you launch a job created as described in [Creating SAP Standard R/3 jobs from the Dynamic Workload Console on page 167](#) and [Task string to define SAP jobs on page 178](#), IBM Workload Scheduler makes a copy of the predefined job (also known as a template job) and runs the copy. If you want to run the job on several SAP systems, you must manually create the template job on each system.

To create and submit SAP jobs dynamically, without creating or referencing predefined job templates, submit:

- In the SAP system, a job that does not reference an existing template in the SAP R/3 database.
- A job that references a predefined job template stored in the SAP R/3 database for which you want to change a parameter.

To take full advantage of this feature, make sure that you have XBP version 2.0 or later installed, because earlier versions of XBP do not support the full set of print and archive parameters, or provide a way to set the job class or the spool list recipient.

## Task string to define SAP jobs dynamically

This section describes the task string that controls the running of SAP jobs. You can build an entire job definition by using the six main sections concerning SAP job parameters. These sections are grouped in [Table 35: Task string parameters for SAP jobs \(dynamic definition\) on page 199](#) and are related to the:

- Job
- Job steps
- Variants associated with the steps (for ABAP modules only)
- Spool list recipients associated with the job

- Flags associated with the job
- Tracing specifications for the job

You can specify them in the following places when you define their associated IBM Workload Scheduler jobs:

- In the **SAP Command Line** section of the Task page of the Submit Ad Hoc Jobs action from the Dynamic Workload Console.
- In the **SAP Command Line** field of the More Options page of the SAP job definition, if you use the Dynamic Workload Console and selected a **SAP** job definition.
- As arguments of the `scriptname` keyword in the job definition statement, if you use the IBM Workload Scheduler command line.
- As arguments of the `JOB CMD` keyword in the `JOBREC` statement in the `SCRIPTLIB` of IBM Z Workload Scheduler, if you are scheduling in an end-to-end environment. The following is an example of a `JOBREC` statement:

```
JOBREC
JOB CMD('/-job job_name -user user_name -i job_ID -c class_value')
JOBUSR(TWS_user_name)
```

To define and submit an SAP job dynamically, use the following syntax:

## Job definition syntax

```
-job job_name [{ -i | -id } job_ID] -flag type=exec [{ -host | -ts } host_name] [ -sg server_group] [ -client
source_client] [ -exec_client target_client] [ -rfc_client rfc_logon_client] [ -c class_value] [ -bdc_job_status_failed
bdc_processing] [{ -nobdc | -nobdcwait} [ -bapi_sync_level { high | medium | low } ] [ -s starting_step_number] ]
[ -s Step_number attribute_name [ = attribute_value ] ] [ -v Step_number variant_name ] [ -vtxt Step_number
variant_description ] [ -vpar Step_number name = variant_value ] [ -vsel Step_number name = { i | e } # operation #
lowest [ # highest ] ] [ -vtemp Step_number ] [ -recipient R/3_login_name ] [ -rectype recipient_type ] [ -flag { reccp
| recbl } ] [ -flag recex ] [ -flag recnf ] [ -flag { im | immed } ] [ -flag { enable_applinfo | disable_applinfo } ] [ -flag
{ enable_appl_rc | disable_appl_rc } ] [ -flag { enable_joblog | disable_joblog } ] [ -flag { enable_job_interceptable |
disable_job_interceptable } ] [ -flag { enable_spoollist | disable_spoollist } ] [ -flag pc_launch ] [ { -debug } ] [ -tracelvl
{ 1 | 2 | 3 } ] [ { -rfctrace } ] [ -rfc_client rfc_logon_client ]
```

The following is an example of a definition for the SAPTEST job:

```
-job SAPTEST -C A -s1 program=BTCTEST -s1 type=A -s1 pr_release
-s2 report=BTCTEST -s2 variant=BVT -s2 type=A -flag type=exec
-vpar2 TESTNAME=test -vtxt2 Test
```

[Table 35: Task string parameters for SAP jobs \(dynamic definition\) on page 199](#) describes the parameters for the task string to define SAP jobs dynamically.



**Note:** The parameter values are case sensitive.

**Table 35. Task string parameters for SAP jobs (dynamic definition)**

| Section | Parameters                        | Description  |
|---------|-----------------------------------|--|
| JOB     | -job <i>job_name</i>              | The name of the job to be run. This parameter is mandatory.  |
|         | -i <i>job_ID</i>                  | The unique SAP job ID. Specify this parameter if you are submitting a job that refers to a predefined job template stored in the SAP database for which you want to change a parameter.  |
|         | -id <i>job_ID</i>                 |  |
|         | -host <i>host_name</i>            | The name of the SAP workstation where the job is to be run. <i>host_name</i> has the format <i>hostname_SAPsystemname_SAPsystemnumber</i> .<br><br>For example, the name of a host might be <i>amss80a0_gs7_90</i><br><br>These parameters are mutually exclusive with -sg.  |
|         | -ts <i>host_name</i>              |  |
|         | -sg <i>server_group</i>           | The name of the SAP server group where the job is to be run. Use this parameter to run the job on an application server that belongs to the group. The server group must exist on the SAP system, otherwise an error code is returned and the job is not launched.<br><br>This parameter is case-sensitive and can be up to 20 characters. It is mutually exclusive with -host and -ts.                  |
|         | -client <i>source_client</i>      | The number that identifies the SAP client where the job definition is to be found, regardless of the client number defined by the <b>r3client</b> key in the options file. This parameter has no effect if a job ID is specified in the job definition.  |
|         | -exec_client <i>target_client</i> | The number that identifies the SAP client where the job is to be run, regardless of the client number defined by the <code>r3client</code> key in the options file. This parameter requires that the client-dependent data (such as the user name and report variants) exists on both the source and target clients.<br><br>This parameter has no effect if a job ID is specified in the job definition. |

**Table 35. Task string parameters for SAP jobs (dynamic definition)**

(continued)

| Section | Parameters   | Description   |
|---------|--|---|
|         | <code>-rfc_client rfc_logon_client</code>          | The number that identifies the SAP client to be used for RFC logon. This value overwrites the value specified by the <code>r3client</code> keyword in the corresponding <code>r3batch</code> options file.  |
|         | <code>-c class_value</code>                        | The priority with which the job runs in the SAP system.<br>Possible values are:<br><b>A</b><br>High priority<br><b>B</b><br>Medium priority<br><b>C</b><br>Low priority. This is the default value.   |
|         | <code>-flag type=exec</code>                       | Specify this parameter to enable the dynamic definition of the SAP job. This parameter is mandatory.  |
| JOB     | <code>-bdc_job_status_failed bdc_processing</code> | How IBM Workload Scheduler sets the completion status of a job running BDC sessions, according to a possible BDC processing failure. The allowed values are:<br><b>n</b><br>If at least <i>n</i> BDC sessions failed (where <i>n</i> is an integer greater than 0), IBM Workload Scheduler sets the job completion status as failed.<br><b>all</b><br>If all the BDC sessions failed, IBM Workload Scheduler sets the job completion status as failed.<br><b>ignore</b><br>When all the BDC sessions complete, regardless of their status, IBM Workload Scheduler sets the job completion status as successful. This is the default value.<br><br>If <b>-nobdc</b> or <b>-nobdcwait</b> is set, this option is ignored. |



Table 35. Task string parameters for SAP jobs (dynamic definition)

(continued)

| Section | Parameters  | Description  |
|---------|---|--|
|         | -nobdc<br>-nobdcwait                                | Disables the BDC Wait option (enabled by default) to have the job considered as completed even if not all its BDC sessions have ended.   |
|         | -bapi_sync_level                                    | Specifies the synchronization level between the SAP function modules BAPI_XBP_JOB_COPY and BAPI_XBP_JOB_START_ASAP. Allowed values are: <p><b>high</b></p> <p>All RFC calls between BAPI_XBP_JOB_START_ASAP and BAPI_XBP_JOB_COPY are synchronized. This is the default.</p> <p><b>medium</b></p> <p>The RFC calls to BAPI_XBP_JOB_START_ASAP are synchronized.</p> <p><b>low</b></p> <p>The RFC calls are not synchronized.</p>   |
| STEP    | -s <i>starting_step_number</i>                      | The number of the starting step.   |
|         | -sstep_number <i>attribute_name=attribute_value</i> | The step number and its attributes, where: <p><b>step_number</b></p> <p>The number of the step being defined. Each step is identified by a sequential number (1, 2, 3, ...n) using the <i>step number</i>.</p> <p><b>attribute_name</b></p> <p>The name of the attribute.</p> <p><b>attribute_value</b></p> <p>The value of the attribute. It is optional for some attributes.</p> <p>Attributes can be defined in any order, but cannot be repeated for the same step. Attribute validation is performed before the job is created in the SAP system. If the validation fails, the IBM Workload Scheduler job goes into the ABEND</p> |

**Table 35. Task string parameters for SAP jobs (dynamic definition)**

(continued)

| Section              | Parameters  | Description   |
|----------------------|---|---|
|                      |   | <p>state. For a detailed description of each attribute and its values, see <a href="#">Defining attributes for ABAP steps on page 207</a> and <a href="#">Defining attributes for external programs and external commands steps on page 211</a>.</p> <p>For example, the following step (step 8) is an ABAP module running the report "MYPGM" and has two attributes, only one of which has a value.</p> <pre data-bbox="824 709 1459 768">-s8 type=A -s8 program=MYPGM -s8 pr_cover="My title" -s8 pr_immed</pre>  |
| VARIANT <sup>1</sup> | <p><code>-vstep_number name</code></p> <p><code>-vtxtstep_number variant_description</code></p> <p><code>-vparstep_number name=value</code></p> <p><code>-vselstep_number name=sign#operation#lowest[#highest]</code></p> | <p>The variant name for the specified step number.</p> <p>The textual description of the variant, in the IBM Workload Scheduler logon language (customizable with the <code>TWSXA_LANG</code> option of <code>r3batch</code>). The maximum length is 30 characters. Not valid for temporary variants.</p> <p>For ABAP modules only. The value for a variant parameter for the specified step number. This parameter is mandatory when creating a new variant. For a complete list of the supported attributes for ABAP steps, see <a href="#">Defining attributes for ABAP steps on page 207</a>.</p> <p>For ABAP modules only. The value for a variant selection option for the specified step number.</p> <p><b>sign</b></p> <p>Sign of the operation. Possible values are:</p> <p><b>I</b><br/>Include</p> <p><b>E</b><br/>Exclude</p> <p><b>operation</b></p> <p>Possible values are:</p> <p><b>EQ</b><br/>Equals</p> |

Table 35. Task string parameters for SAP jobs (dynamic definition)

(continued)

| Section | Parameters               | Description  |
|---------|--------------------------|--|
|         | <b>NE</b>                | Not equal to   |
|         | <b>BT</b>                | Between  |
|         | <b>NB</b>                | Not between  |
|         | <b>LT</b>                | Less than  |
|         | <b>LE</b>                | Less than or equal to  |
|         | <b>GT</b>                | Greater than   |
|         | <b>GE</b>                | Greater than or equal to   |
|         | <b>CP</b>                | Contains pattern   |
|         | <b>NP</b>                | Does not contain pattern   |
|         | <b>lowest</b>            | Low value of the selection. You can use up to 45 characters.   |
|         | <b>highest</b>           | High value of the selection. You can use up to 45 characters. This attribute is optional.  |
|         |                          | For a complete list of the supported attributes for ABAP steps, see <a href="#">Defining attributes for ABAP steps on page 207</a> .   |
|         | <i>-vtempstep_number</i> | For ABAP modules only. Specifies to assign a temporary variant to the specified step number. Temporary variants are created ad-hoc by the SAP system and assigned to the job instance when it is run. The lifecycle of the temporary |

**Table 35. Task string parameters for SAP jobs (dynamic definition)**

(continued)

| Section | Parameters             | Description   |
|---------|------------------------|---|
|         |                        | variant is determined by the SAP system. If the job is deleted by SAP, then the temporary variant is deleted. See <a href="#">Examples: Dynamically defining and updating SAP jobs on page 213</a> to refer to examples that demonstrate the behavior of temporary variants.  |
| SPOOL   | -recipient <i>name</i> | The login name of an SAP user.  |
|         | -flag {reccp recbl}    | Specifies how the spool list is sent to the recipient. Possible values are: <ul style="list-style-type: none"> <li><b>reccp</b><br/>The spool list is sent as a copy.</li> <li><b>recbl</b><br/>The spool list is sent as a blind copy.</li> </ul>  |
|         | -flag recex            | Specifies that the spool list is sent as an express message to the recipient.   |
|         | -flag recnf            | Specifies that the recipient is not allowed to forward the spool list.  |
|         | -rectype <i>type</i>   | Specifies the recipient type. Possible values are: <ul style="list-style-type: none"> <li><b>blank</b><br/>SAP user (default value)</li> <li><b>B</b><br/>SAP user</li> <li><b>C</b><br/>Shared distribution list</li> <li><b>D</b><br/>X.500 address</li> <li><b>G</b><br/>Organization object/ID</li> <li><b>H</b><br/>Organization unit</li> </ul> |

Table 35. Task string parameters for SAP jobs (dynamic definition)

(continued)

| Section | Parameters                                      | Description  |
|---------|---|--|
|         |   | <b>I</b>   |
|         |   | SAP object   |
|         |   | <b>L</b>   |
|         |   | Telex number   |
|         |   | <b>O</b>   |
|         |   | SAPoffice user   |
|         |   | <b>P</b>   |
|         |   | Private distribution list  |
|         |   | <b>R</b>   |
|         |   | SAP user in another SAP system   |
|         |   | <b>U</b>   |
|         |   | Internet address   |
|         |   | <b>1</b>   |
|         |   | Other recipient type   |
| FLAGS   | -flag im<br>-flag immed                         | Specifies to launch the job immediately, meaning that if there are no spare work processes, the job fails.   |
|         | -flag enable_applinfo<br>-flag disable_applinfo | Enables or disables the retrieval and appending of the SAP application log to the stdlist of IBM Workload Scheduler.   |
|         | -flag enable_appl_rc<br>-flag disable_appl_rc   | Enables or disables the mapping of the SAP application return code to the IBM Workload Scheduler return code.<br><br>The SAP application return code is mapped only if <b>-flag enable_applinfo</b> is set and the application log contains the application return code. |
|         | -flag enable_joblog<br>-flag disable_joblog     | Enables or disables retrieval of the joblog.   |
|         | -flag enable_joblog<br>-flag disable_joblog     | Enables or disables retrieval of the joblog.   |

**Table 35. Task string parameters for SAP jobs (dynamic definition)**

(continued)


| Section   | Parameters   | Description  |
|---|--|--|
| <p>-flag enable_job_interceptable<br/>-flag disable_job_interceptable</p>           | <p>Enables or disables the job launched by r3batch to be intercepted by SAP. If enabled, when r3batch launches a job and the SAP job interception feature is enabled, the job can be intercepted if it matches previously defined criteria. If disabled, the job launched by r3batch cannot be intercepted by SAP. This setting overwrites the setting in the common options file.</p> |  |
| <p>-flag<br/>pc_launch</p>  | <p>Specifies to launch child jobs that are in scheduled state.</p> <p><b>ON</b></p> <p>The product launches child jobs that are in scheduled state.</p> <p><b>OFF</b></p> <p>The product does not launch child jobs that are in scheduled state. This is the default value.</p>  |  |
|  | <p><b>Note:</b> You can use this option only if you activated the parent-child feature on the SAP system. On the XBP 2.0 (or later) SAP system, you activate this feature by using the INITXBP2 ABAP report.</p>   |  |
| <p>TRACING</p>  | <p>-debug<br/>-tracelvl 1 2 3</p>  | <p>Enables maximum trace level.</p> <p>Specifies the trace setting for the job. Possible values are:</p> <p><b>1</b></p> <p>Only error messages are written in the trace file. This is the default.</p> <p><b>2</b></p> <p>Informational messages and warnings are also written in the trace file.</p> |

Table 35. Task string parameters for SAP jobs (dynamic definition)

(continued)

| Section | Parameters | Description  |
|---------|------------|--|
|         |            | <b>3</b>   |
|         |            | A most verbose debug output is written in the trace file.                                |
|         |            | For more details, refer to <a href="#">Configuring the tracing utility on page 118</a> . |
|         |            | Enables RFC trace.   |
|         | -rfctrace  |  |
|         | -trace     |  |



**Note:** See [Examples: Dynamically defining and updating SAP jobs on page 213](#) to refer to examples that demonstrate the behavior of variants and temporary variants.

1. The following rules apply when you create or update SAP jobs dynamically:
  - To create or reference a variant within an ABAP step, you can use one of the following equivalent syntaxes:
    - -s1 Variant=Var1
    - -s1 Parameter=Var1
    - -v1 Var1
  - If a variant does not exist, it is created with the parameters specified in the job definition statement. In this case, all the required attributes of the variant must be given a value. You cannot create empty variants. For example, if you specify **-vtemp1**, with no value assigned, an empty temporary variant is erroneously created.
  - If a variant is already present in the SAP system, its values are modified according to the command line parameters. If the existing variant is an extended one, a new instance of it is created with resolved placeholders and updated counters. This new variant instance is then updated using the values from the command line. Finally, the job step is run using this variant instance.
  - All changes to the variant values are permanent. That is, IBM Workload Scheduler neither restores the old values of the variants, nor deletes the variants created after the job is run. IBM Workload Scheduler does not change the case of the variant values.

## Defining attributes for ABAP steps

To create and submit SAP jobs dynamically, look at the table and define the attributes for ABAP steps.

Table 36: Supported attributes for ABAP step definition on page 208 shows a complete list of the supported attributes for ABAP step module definition:

**Table 36. Supported attributes for ABAP step definition**

| Attribute name | Synonym       | Description   | Required |
|----------------|---------------|---|----------|
| type           | typ           | Specify the step type. Possible values are: <ul style="list-style-type: none"> <li>• A</li> <li>• ABAP</li> </ul>   | ✓        |
|                |               | The product performs a check for correct attribute values prior to launching the job.   |          |
| program        |               | Specify the ABAP program name.  | ✓        |
| parameter      |               | Specify the ABAP variant name.  | ✓        |
| user           | authcknam     | Specify the user of the step.   | ✓        |
| language       | lang          | Specify the step language. <p>This attribute accepts language names in either the ISO format (two characters, for example DE, EN) or the R/3 format (one character, for example D, E).</p> <p>If this attribute is not specified, the login language of the access method is used (customize using the option <b>twsxa_lang</b> in the r3batch options files).</p> <p>The product performs a check for a valid language prior to launching the job.</p> | ✓        |
| pr_dest        | printer pdest | Print Parameter: Specify the printer for the output.  |          |
| pr_copies      | prcop         | Print Parameter: Specify the number of copies. The value of this attribute must be numeric. A corresponding check is performed prior to launching the job.  |          |
| pr_lines       | linct         | Print Parameter: Specify the page length. <p>The value of this attribute must be numeric. A corresponding check is performed prior to launching the job.</p>  |          |
| pr_columns     | linsz         | Print Parameter: Specify the page width.  |          |



Table 36. Supported attributes for ABAP step definition (continued)

| Attribute name | Synonym    | Description   | Required |
|----------------|------------|---|----------|
|                |            | The value of this attribute must be numeric. A corresponding check is performed prior to launching the job.   |          |
| pr_auth        | prber      | Print Parameter: Authorization  |          |
| pr_arcmode     | armod      | Print Parameter: Archiving mode   |          |
| pr_sapbanner   | prsap      | Print Parameter: SAP cover page   |          |
| pr_exp         | pexpi      | Print Parameter: Spool retention period   |          |
|                |            | The value of this attribute must be a single digit. A corresponding check is performed prior to launching the job.  |          |
| pr_recip       | prrec      | Print Parameter: Recipient  |          |
| pr_spoolname   | plist      | Print Parameter: Name of spool request <sup>1</sup>   |          |
| pr_format      | paart      | Print Parameter: Print formatting <sup>1</sup>  |          |
| pr_dep         | prabt      | Print Parameter: Department on cover page <sup>1</sup>  |          |
| pr_spools      | prdsn      | Print Parameter: Name of spool data set <sup>1</sup>  |          |
| pr_spoolprio   | priot      | Print Parameter: Spool request priority <sup>1</sup>  |          |
| pr_immed       | primm      | Print Parameter: Print immediately <sup>2</sup>   |          |
| pr_release     | prrel      | Print Parameter: Delete after printing <sup>2</sup>   |          |
| pr_banner      | prbig      | Print Parameter: Selection cover page <sup>2</sup>  |          |
| pr_newspool    | prnew      | Print Parameter: New spool request <sup>1 2</sup>   |          |
| pr_cover       | prtxt      | Print Parameter: Text for cover page <sup>1</sup> . If the string contains spaces it must be enclosed between single quotes.  |          |
| pr_hostcover   | prunx      | Print Parameter: Host spool cover page <sup>1</sup> . Possible values are:<br>''<br>Blank. Does not use any cover page.<br>'X'<br>Prints the host cover page.<br>'D'<br>Prints the default host cover page. |          |
| al_sapobject   | sap_object | SAP ArchiveLink: Object type of business object   |          |
| al_object      | object     | SAP ArchiveLink: Document type  |          |

**Table 36. Supported attributes for ABAP step definition (continued)**

| Attribute name | Synonym    | Description   | Required |
|----------------|------------|---|----------|
| al_info        | info       | SAP ArchiveLink: Info field   |          |
| al_id          | archiv_id  | SAP ArchiveLink: Target storage system <sup>1</sup>                         |          |
| al_doctype     | doc_type   | SAP ArchiveLink: Document class <sup>1</sup>                                |          |
| al_rpcost      | rpc_host   | SAP ArchiveLink: PRC host <sup>1</sup>                                      |          |
| al_rpcserv     | rpc_servic | SAP ArchiveLink: RPC service / RFC destination <sup>1</sup>                 |          |
| al_iface       | interface  | SAP ArchiveLink: Name of communication connection component<br><sup>1</sup> |          |
| al_client      | mandant    | SAP ArchiveLink: Client <sup>1</sup>  |          |
| al_report      |            | SAP ArchiveLink: Report name <sup>1</sup>                                   |          |
| al_text        | arctext    | SAP ArchiveLink: Text information field <sup>1</sup>                        |          |
| al_date        | datum      | SAP ArchiveLink: Archiving date <sup>1</sup>                                |          |
| al_user        | arcuser    | SAP ArchiveLink: Data element for user <sup>1</sup>                         |          |
| al_printer     |            | SAP ArchiveLink: Target printer <sup>1</sup>                                |          |
| al_format      | formular   | SAP ArchiveLink: Output format <sup>1</sup>                                 |          |
| al_path        | archivpath | SAP ArchiveLink: Standard archive path <sup>1</sup>                         |          |
| al_protocol    | protokoll  | SAP ArchiveLink: Storage connection protocol <sup>1</sup>                   |          |
| al_version     |            | SAP ArchiveLink: Version number <sup>1</sup>                                |          |

**Note:**

1. This attribute is available for BC-XBP 2.0 and later.
2. This attribute is a flag, that is, it does not have a value, for example: `-s2 pr_release`.

IBM Workload Scheduler performs the following syntax validation on job attributes:

- Only valid attributes are allowed.
- Checks if a particular attribute requires a value.
- The values of the following attributes are checked:
  - type
  - language
  - pr\_copies
  - pr\_lines
  - pr\_columns

Validation is performed before the job is created in the SAP system. If the validation fails, the IBM Workload Scheduler job goes into the ABEND state.

## Defining attributes for external programs and external commands steps

[Table 37: Supported attributes for external programs and external commands step definition on page 211](#) shows a complete list of the supported attributes for external programs and external commands step definition.

**Table 37. Supported attributes for external programs and external commands step definition**

| Attribute name | Synonym   | Description   | Required |
|----------------|-----------|---|----------|
| type           | typ       | The step type can assume one of the following values:<br><br><b>For external programs</b><br><br><ul style="list-style-type: none"> <li>• X</li> <li>• EXTPRG</li> </ul><br><b>For external commands</b><br><br><ul style="list-style-type: none"> <li>• C</li> <li>• EXTCMD</li> </ul><br>Before launching the job, the product performs a check for correct attribute values.   | ✓        |
| report         |           | ABAP program name or name of the external program or command.   | ✓        |
| parameter      |           | Parameters for the external program or command.   |          |
| user           | authcknam | User of the step.   |          |
| language       | lang      | Step language.<br><br>This attribute accepts language names in either the ISO format (two characters, for example DE, EN) or the R/3 format (one character, for example D, E).<br><br>If this attribute is not specified, the login language of the access method is used (customize using the <b>twsxa_lang</b> option in the <code>r3batch</code> option files).<br><br>The product performs a check for a valid language prior to launching the job. |          |
| targethost     | xpgtgtsys | Target host for the external program or command. This name must be exactly the same as the name shown in the External Operating System Commands table in the SAP system (transaction <code>sm69</code> ).   |          |

**Table 37. Supported attributes for external programs and external commands step definition (continued)**

| Attribute name | Synonym     | Description   | Required |
|----------------|-------------|---|----------|
| os             | opssystem   | Operating system for the external command. This name must be exactly the same as the name shown in the External Operating System Commands table in the SAP system (transaction <code>sm69</code> ). |          |
| termcntl       | waitforterm | Control flag: if an external command or program is to be run synchronously. <sup>2</sup>  |          |
| tracecntl      |             | Control flag: if SAP tracing level 3 is activated for tracing SAPXPG, the program that starts an external command or program. <sup>1 2</sup>  |          |
| stdoutcntl     |             | Control flag: indicates if standard output from an external command or program is to be written to the job log. <sup>1 2</sup>  |          |
| stderrcntl     |             | Control flag: indicates if standard error from an external command or program is to be written to the job log. <sup>1 2</sup>   |          |

**Note:**

1. This attribute is available for BC-XBP 2.0 and later.
2. This attribute is a flag, that is, it does not have a value, for example: `-s2 pr_release`.

IBM Workload Scheduler performs the following syntax validation on job attributes:

- Only valid attributes are allowed.
- Checks if a particular attribute requires a value.
- The values of the following attributes are checked:
  - type
  - language
  - pr\_copies
  - pr\_lines
  - pr\_columns

Validation is performed before the job is created in the SAP system. If the validation fails, the IBM Workload Scheduler job goes into the ABEND state.

## Specifying job parameters using variable substitution

Parameters can be provided at run time using the variable substitution feature. For example, the value appears as:

```
-s1 report=&VARNAME
```

The variable substitution process occurs while IBM Workload Scheduler is creating the symphony file.

## Examples: Dynamically defining and updating SAP jobs

This section describes some usage examples of this feature:

### Job definition and run scenario using the `-flag type=exec` parameter

The following example creates and runs a 3-step job. The first step runs the ABAP MYPROG1 using variant VAR01 and associated variant parameter. Step 2 has a step user defined. Step 3 uses the same ABAP as step 1 with no associated variant.

The only requirement is that the elements referred to are known in the SAP system (user, program). If the variant does not exist, there should be a set of values to define the content of the variant for its creation (pairs of `-vparN -vselN` parameters for the parameters and selections of the ABAP program).

```
-job TESTJOB01 -c A
-s1 type=A -s1 program=MYPROG1
-v1 VAR01 -vpar1 TESTNAME=TST
-s2 report=SPOOLX1 -s2 user=PRTUSER
-s3 type=A -s3 program=MYPROG1 -flag type=exec
```

The job returns job ID 12345678

### Job copy and overwrite the job created in the previous step

The following job statement references the job created in the previous example. A new copy of the job is made and the parameters specified in the invocation are used to update the definition. In this case the variant for step 1 is modified and a new external program step (Step 4) is added.

```
-job TESTJOB01 -i 12345678
-s1 variant=VAR01A
-vpar1 TESTNAME=TST2
-s4 type=X -s4 report=niping -s4 parameter=-t
-flag type=exec
```

### Copy and overwrite a job referencing an existing job template

The following example shows a job creation referencing a job template (previously created without using this feature). A template job called TEMPLAJOB already exists on the SAP system with an ID of 56780123. It is a single ABAP step job to which we now add some print parameters.

```
-job TEMPLAJOB
-I 56780123 -s1 pr_immed
-flag type=exec
```

### A temporary variant is created using the information indicated in the expression

The following is the syntax to be used:

```
-vpar1 <parameter_name>=<parameter_value> ...
-vsel1 <selection_option_name>
... -vtempl
```

The following example shows how you can submit a job that creates a temporary variant that is assigned to step number 1, and assigns a value to a variant parameter for step number 1:

```
-job TESTJOB01 -C A -flag type=exec -user R3USER
-s1 type=A -s1 program=MYPROG1
-vtemp1 -vpar1 TESTNAME=TST
```

The following example shows how you can submit a job that creates a temporary variant that is assigned to step number 1, assigns a value to a variant parameter for step number 1, and assigns a value to a variant selection option (date) for step number 1:

```
-job TESTJOB01 -C A -flag type=exec -user R3USER
-s1 type=A -s1 program=MYPROG1
-vtemp1 -vpar1 FILENAME=FLN
-vsel1 date=E#BT#20110101#20110412
```

### Assign a temporary variant to the specified step number

The following is the syntax to be used:

```
-v1 <temporary_variant_name> -vtemp1
```

The following is an example of how you can submit a job to assign a temporary variant, which has already been created (as in the previous example), and assign a value to step number 1:

```
-job TESTJOB01 -C A -flag type=exec -user R3USER
-s1 type=A -s1 program=MYPROG1
-vtemp1 -v1 &000000000001
```

### The value for a temporary variant that already exists is substituted with the value indicated in the expression

The following is the syntax to be used:

```
-v1 <temporary_variant_name> -vpar1 <parameter_name>=<parameter_value> ...
-vsel1 <selection_option_name> ... -vtemp1
```

The following is an example of how you can submit a job that substitutes the value of a temporary variant, which must already exist, with a new value. The temporary variant must exist, otherwise, the expression returns an error.

```
-job TESTJOB01 -C A -flag type=exec -user R3USER
-s1 type=A -s1 program=MYPROG1
-vtemp1 -v1 &000000000001 -vpar1 TESTNAME=TST2
```

## Defining conditions and criteria

IBM Workload Scheduler accesses the Computer Center Management System (CCMS) Background Processing components of SAP systems through the BC-XBP interface to provide additional capabilities from the Dynamic Workload Console, one of those being the Criteria Manager.

IBM Workload Scheduler supports the BC-XBP 3.0 interface which provides functions to control R/3 batch jobs.

The Criteria Manager is a tool that enables you to define conditions and criteria that, when combined, form complex dependencies that you can use in the following contexts:

- Managing raised events in the SAP event history.
- Managing reorganization tasks against the SAP event history.
- Intercepting jobs.

If you have other types of criteria defined on your SAP system, then you can perform other actions in addition to those listed in this section.

### The criteria profile

The Criteria Manager enables you to define a criteria profile which is a container for a combination of criteria. The criteria profile can be of various types and each criteria type has a standard set of selection criterion. For each criteria, you can specify a single value, a range of values by indicating a lower and upper limit, and multiple values. The following is the standard set of selection criterion for each criteria profile type. In addition to these, you can also see any other types of criteria profiles you have defined on your SAP system:

#### Event History

##### EVENTID

The identifier of the event defined in the SAP system.

##### EVENTPARM

The parameter of the event defined in the SAP system.

##### PARMID

The identifier of the parameter of the event defined in the SAP system.

#### Event History Reorg

##### Event State

The state of the event.

##### Event Timestamp

The timestamp for the event.

#### Interception

##### Job Name

A name identifying the job.

##### Job Class

The class assigned to the job that represents the priority with which the job runs in the SAP system.

### The criteria hierarchy

You create and combine criteria in a criteria hierarchy. The criteria hierarchy is a set of all the criteria that must be fulfilled for a specific action to take place in the specific context. For example, you can define a criteria hierarchy to log all raised events in the SAP event history with an event name that begins with "CRITICAL\_EVENT" and with an event argument equal to 150.

The criteria in the hierarchy is grouped in nodes and relationships between the nodes are determined by the logical operators AND or OR. You can nest nodes in other nodes.

To have the criteria profile begin processing, the criteria profile must be activated. Only one criteria profile of the same type can be active at one time.

## Example

### An example

See [Example: Defining which raised events to log on page 216](#) for an example that demonstrates how to build a criteria hierarchy to manage the logging of raised events in the SAP event history.

## Example: Defining which raised events to log

The event history stores all events that are raised by the system. You can define specific criteria so that only raised events that match certain criteria are logged.

The event history enables IBM Workload Scheduler to consume events that are raised by the SAP system.

Checking the log of raised events gives you access to the following information:

- Verify that an event was raised in the system.
- Verify if the event was processed.

In the example that follows, an event history criteria profile is created that contains the definition of the criteria, the criteria hierarchy, that events must fulfill to be logged in the event history. The criteria profile must then be activated so that it can begin processing events according to the criteria.

The criteria profile, `Event profile 1`, contains a criteria hierarchy that logs only those events in the event history with event name that begins with `CRITICAL_EVENT` and event argument equal to "789".

## Create the criteria profile

A criteria profile contains the definition of the criteria you want to set for logging raised events.

### About this task

Create a criteria profile, `Event profile 1`, of type, Event History, to contain the criteria hierarchy.

1. In the Navigation bar at the top, click **Design > SAP > Manage SAP Criteria Profiles**.
2. In **Engine name**, select the name of the IBM Workload Scheduler engine connection from which you want to work with SAP jobs.
3. In **Workstation name**, type the name of the workstation where the SAP job runs. This is the workstation with the `r3batch` access method that communicates with the remote SAP system. If you do not know the name of the workstation, click the **Lookup Workstations** icon to enter your filter criteria and click **Search**. If you enter a string representing part of the workstation name, it must be followed by the asterisk (\*) wildcard character. Both the question mark (?) and asterisk (\*) are supported as wildcards. You can also simply use the asterisk wildcard character (\*) to display all workstations. Optionally, specify any of the other search criteria available and click **Search**.

### Result

From the results displayed, select the workstation and click **OK**.



4. In **Options file**, specify an options file that resides on the specified workstation. Each workstation can have one or more options files that can be used to customize the behavior of the r3batch access method, except for extended agent workstations, where only one options file can exist and therefore does not need to be specified. For the workstation specified, enter the file name of the options file or click pick icon to search for options files that reside on the specified workstation and select one.
5. Click **Go**.
6. From the Criteria Manager main view, click **New** to create a criteria profile.
7. Select **Event History** as the type of criteria profile you want to create.
8. Enter descriptive text that enables you to easily identify the criteria profile in the table of criteria profiles. Type `Event profile 1`. Avoid using special characters such as, < (less than), > (greater than), or the ' (apostrophe) in this field.
9. Click **Save**.

### Results

The criteria profile is displayed in the list of criteria profiles and it is not yet active.

### What to do next

Next, begin building the criteria hierarchy. The criteria profile is the container for the criteria hierarchy.

## Build the criteria hierarchy



The criteria hierarchy is stored in the criteria profile and is made up of criteria. A group of criteria is contained in a node.

### Before you begin

The criteria hierarchy is made up of a combination of nodes and criteria. A node contains a group of criteria where the relationship between the criteria is determined by an AND or an OR relation. You can nest nodes in other nodes. By default, a top level AND node is created in the criteria hierarchy. You can create other AND or OR nodes nested in this parent node. You can also add one or more criterion to the nodes. Add an AND node when all of the criteria defined in the node must be fulfilled. Add an OR node when at least one of the criteria defined in the node must be fulfilled.


### About this task

In this example, define a criterion that logs all events whose name begins with `CRITICAL_EVENT` and with event argument equal to 789.

1. Click  to create a new criterion in the default AND node.
2. In **Description**, type `Criterion 1`.
3. In **EVENTID**, click  to specify the value for the EVENTID field.
4. Leave the default value **Select** to indicate to use the selection criterion specified when processing events.
5. In **Options**, select **Pattern** and in **Single Value or Lower Limit**, type `CRITICAL_EVENT*`.

### Result

This sets the condition for the event name.

6. In **EVENTPARM**, click  to specify the value for the EVENTPARM field.
7. Leave the default value **Select** to indicate to use the selection criterion specified when processing events.

8. In **Options**, select **Equal to** and in **Single Value or Lower Limit**, type 789.

**Result**

This sets the condition for the event argument.

9. Click **Save** to save the criterion definition.

**Results**

The criteria profile now contains a criterion that specifies which raised events must be logged. You can continue to create another criteria in the same parent node or you can nest either an AND or an OR node in the parent node to determine the logical relation between the criteria that the nested node will contain. Add an AND node within which you can create one or more criteria where all the criteria specified in the node must be fulfilled, or add an OR node within which you can create one or more criteria where at least one of the criteria specified must be fulfilled.

**What to do next**

To apply this criteria profile so that it begins processing events according to the criteria defined, you must activate the criteria profile.

## Activate the criteria profile

To apply the `Event profile 1` criteria profile so that it begins processing raised events according to the criteria specified in the criteria hierarchy, you must activate the criteria profile.

**About this task**

A criteria profile can either be active or not active. For a criteria profile to take effect, the profile must be activated. Only one criteria profile of the same type can be active at one time. Criteria profiles cannot be edited if they are in the active state. Follow the procedure to activate the `Event profile 1` criteria profile.

1. Select the `Event profile 1` criteria profile from the table of criteria profiles.

2. Select **Activate** from the toolbar. 

**Results**

The status of the criteria profile is updated to show that it is now active. The criteria profile can now begin to process raised events according to the specifications of the criteria hierarchy and log them to the event history. If another criteria profile of the same criteria type was active, its status changes to inactive.

## Using the BDC Wait option

By using the Batch Data Collector (BDC) Wait option, you can specify that a SAP job launched by IBM Workload Scheduler is not to be considered complete until all of its BDC sessions have completed.

**About this task**

The Batch Data Collector (BDC) Wait option prevents other IBM Workload Scheduler jobs that are dependent on the SAP job from being launched until all of the related BDC sessions for the SAP job have ended.

To use the option, a SAP job must write informational messages in its job log. This can be done by modifying the SAP function module BDC\_OPEN\_GROUP as follows:

```

FUNCTION BDC_OPEN_GROUP.
...
CALL 'BDC_OPEN_GROUP' ID 'CLIENT'      FIELD CLIENT
                        ID 'GROUP'      FIELD GROUP
                        ID 'USER'       FIELD USER
                        ID 'KEEP'       FIELD KEEP
                        ID 'HOLDDATE'   FIELD HOLDDATE
                        ID 'DESTINATION' FIELD DEST
                        ID 'QID'        FIELD QID
                        ID 'RECORD'     FIELD RECORD
                        ID 'PROG'       FIELD PROG.

*
IF SY-SUBRC EQ 0.
  BQID  = QID.
  BUSER = SY-MSGV1.
  BGROUP = GROUP.
* CALL FUNCTION 'DB_COMMIT' .
  CALL FUNCTION 'ENQUEUE_BDC_QID'
  EXPORTING  DATATYP = 'BDC '
  GROUPID   = BGROUP
  QID       = BQID
  EXCEPTIONS FOREIGN_LOCK = 98
            SYSTEM_FAILURE = 99.

  IF SY-SUBRC EQ 0.
    message i368(00) with 'BDCWAIT: ' qid.
  ENDIF.

ENDIF.
*
PERFORM FEHLER_BEHANDLUNG USING SY-SUBRC.
*
*
ENDFUNCTION.

```



**Note:** The actual parameters of the call of the C function (`CALL 'BDC_OPEN_GROUP' ID ...`) might vary depending on the SAP release. With this approach, you obtain a global change in your SAP system.

The completion status of a SAP job launched by IBM Workload Scheduler is based on the value you set for the `bdc_job_status_failed` option. By default, this option is set to `ignore`, meaning that the job is considered successfully completed when the BDC sessions are finished, regardless of their success or failure. For details about the `bdc_job_status_failed` option, refer to [Table 33: Task string parameters for SAP jobs on page 180](#).

## Job interception and parent-child features

This section describes how the job interception and parent-child features of BC-XBP 2.0 and 3.0 are supported by IBM Workload Scheduler.



**Note:** The process of defining relaunch criteria and collecting and relaunching intercepted jobs is supported only in distributed environments and not in z/OS environments.

## Implementing job interception

The high-level steps required to implement job interception.

### About this task

Job interception is a feature of both the BC-XBP 2.0 and BC-XBP 3.0 interfaces. It enables IBM Workload Scheduler to have a very sophisticated control over the jobs launched by SAP users from the SAP graphical interface.

The job interception mechanism becomes active when the SAP job scheduler is about to start an SAP job (that is, when the `start` conditions of an SAP job are fulfilled). It checks the job parameters (`job name`, `creator`, `client`) against the entries in the SAP table `TBCICPTL`, and when the job parameters match the criteria, the SAP job is set back to the `scheduled` status and is marked with a special flag, denoting that the job has been intercepted. The criteria defined in the criteria table establishes which jobs are intercepted.

If IBM Workload Scheduler has been set up to handle job interception, it periodically runs its own job to retrieve a list of intercepted jobs and reschedules them to be relaunched. This job can be referred to as the *interception collector* job.

Job interception with the BC-XBP 2.0 interface is based on the single extended agent workstation, whereas with the BC-XBP 3.0 interface, job interception is based on the currently active job interception criteria profile.



### Note:

- Jobs launched by IBM Workload Scheduler, or by any other external scheduler using the BC-XBP interface, can be intercepted provided the **job\_interceptable** option in the common options file is set to `ON`, and the **-flag enable\_job\_interceptable** keyword is included in the job definition.
- Ensure that the job interception and job throttling features are not running at the same time. The interception collector jobs fail if a job throttler instance is running. To stop the job throttler, refer to [Step 5. Starting and stopping the job throttling feature on page 249](#).

The following are the high-level steps required to implement job interception for both the BC-XBP 2.0 and 3.0 interfaces.

## Job interception and the BC-XBP 2.0 interface

### About this task

To set up IBM Workload Scheduler to handle job interception in an SAP environment with the BC-XBP 2.0 interface, implement the following steps:

1. Install the BC-XBP 2.0 interface. Refer to SAP Note 604496 to know if your SAP system already has the BC-XBP 2.0 interface, or which SAP support package you need to install to enable it.
2. Define an IBM Workload Scheduler job to periodically collect the intercepted SAP jobs.
3. Specify interception criteria in the SAP system.
4. Specify interception criteria in IBM Workload Scheduler from the Monitor Workstations portlet on the Dynamic Workload Console. The criteria is set at workstation level.
5. Activate the job interception feature of the BC-XBP 2.0 interface.

## Job interception and the BC-XBP 3.0 interface

### About this task

To set up IBM Workload Scheduler to handle job interception in an SAP environment with the BC-XBP 3.0 interface, implement the following steps:

1. Verify if the BC-XBP 3.0 interface is already installed on the SAP system.
2. Define an IBM Workload Scheduler job to periodically collect the intercepted SAP jobs.
3. Specify interception criteria in the SAP system.
4. Specify interception criteria in IBM Workload Scheduler from the Manage SAP Criteria Profiles portlet on the Dynamic Workload Console.
5. Activate the job interception feature of the BC-XBP 3.0 interface.

## Collecting intercepted jobs periodically for BC-XBP 2.0

With the BC-XBP 2.0 interface, you can configure the job interception collector using an IBM Workload Scheduler job that periodically retrieves intercepted jobs and relaunches them.

### About this task

Define an IBM Workload Scheduler job that uses the SAP interception collector task to collect intercepted jobs and restart them.

To define an IBM Workload Scheduler job that collects intercepted job and relaunches them, use the following syntax:

```
ENGINE_NAME_HOSTING_XA#[folder/]JOBNAME
SCRIPTNAME "TWA_home/methods/r3batch -t HIJ -c UNIQUE_ID"
DESCRIPTION "Collects intercepted jobs on SAP XA XA_Unique_ID"
STREAMLOGON TWSuser
RECOVERY STOP
```

Where:

#### **ENGINE\_NAME\_HOSTING\_XA**

The name of the engine workstation hosting the XA workstation with the r3batch access method that communicates with the SAP system.

#### **JOBNAME**

Name of the IBM Workload Scheduler job and the folder in which it is defined, if any.

**TWA\_home**

Fully qualified path to your IBM Workload Scheduler installation.

**XA\_Unique\_ID**

The unique identifier for the extended agent workstation. See [UNIQUE\\_ID on page 49](#) for more details about retrieving the unique identifier.

**-t HIJ**

This is the SAP task type to run the job interception collector. HIJ stands for `Handle Intercepted Jobs`.

**TWSuser**

Name of the IBM Workload Scheduler user that launches the access method.

The interception collector job runs at periodical intervals; for example, every 10 minutes. It retrieves all the jobs that have been intercepted since the last run of the interception collector, and launches them again according to a template.

## Collecting intercepted jobs periodically for BC-XBP 3.0

With the BC-XBP 3.0 interface, you can configure the job interception collector using an IBM Workload Scheduler job that periodically retrieves intercepted jobs and relaunches them.

**About this task**

Because intercepted jobs remain in the `Released` and then `Intercepted` status until they are relaunched, you need to use the SAP interception collector task to collect and relaunch them.

To define an IBM Workload Scheduler job that collects and relaunches jobs use the following syntax:

```
ENGINE_NAME_HOSTING_XA#[folder/]JOBNAME
DOCOMMAND "TWA_home/methods/r3batch -t HIJ -c UNIQUE_ID -- \
  "-profile_id profile_ID_number\"
STREAMLOGON TWSuser
DESCRIPTION "Collects intercepted jobs on SAP XA XA_Unique_ID"
TASKTYPE UNIX
RECOVERY STOP
```

where,

**ENGINE\_NAME\_HOSTING\_XA**

The name of the engine workstation hosting the XA workstation with the r3batch access method that communicates with the SAP system.

**JOBNAME**

Name of the IBM Workload Scheduler job and the folder within which it is defined, if any.

**TWA\_home**

Fully qualified path to your IBM Workload Scheduler installation.

***XA\_Unique\_ID***

The unique identifier for the extended agent workstation. See [UNIQUE\\_ID on page 49](#) for more details about retrieving the unique identifier.

**-t HIJ**

This is the SAP task type to run the job interception collector. HIJ stands for `Handle Intercepted Jobs`.

**- profile\_id profile\_ID\_number**

Specifies the identification number of the interception criteria profile on the SAP system for XBP 3.0.

***TWSuser***

Name of the IBM Workload Scheduler user that launches the access method.

The interception collector job runs at periodical intervals; for example, every 10 minutes. It retrieves all the jobs that have been intercepted since the last run of the interception collector, and launches them again according to a template.



**Note:** If the interception collector is configured for XBP 3.0 job interception, but the XBP 2.0 interface is configured on the SAP system, the collector fails. Ensure the XBP interface versions are synchronized.

## Setting interception criteria on the SAP system

### About this task

In SAP, the interception criteria are held in table `TBCICPT1`. Only jobs that match the criteria of this table are intercepted, when their `start` conditions are fulfilled. All the other jobs are run normally.

You can maintain the entries in this table by using transaction `se16` and setting the following:

- Client number
- Job mask
- User mask

## Setting interception criteria on IBM Workload Scheduler

### About this task

In IBM Workload Scheduler, interception criteria are defined and used by setting:

#### Table criteria

##### For BC-XBP 2.0

You use the **Monitor Workload** of Dynamic Workload Console to set table criteria.

For details about how you set table criteria, see [Setting SAP table criteria on the extended agent workstation on page 224](#).

### For BC-XBP 3.0

You set table criteria from the **Administration > Workload Design > Manage SAP Criteria Profiles** panel from the Dynamic Workload Console.

For details about how you set table criteria, see [Setting SAP criteria in the job interception criteria profile on page 225](#).

### Template files (optional)

For details about how you create template files, see [Using template files on page 227](#).

## Setting SAP table criteria on the extended agent workstation

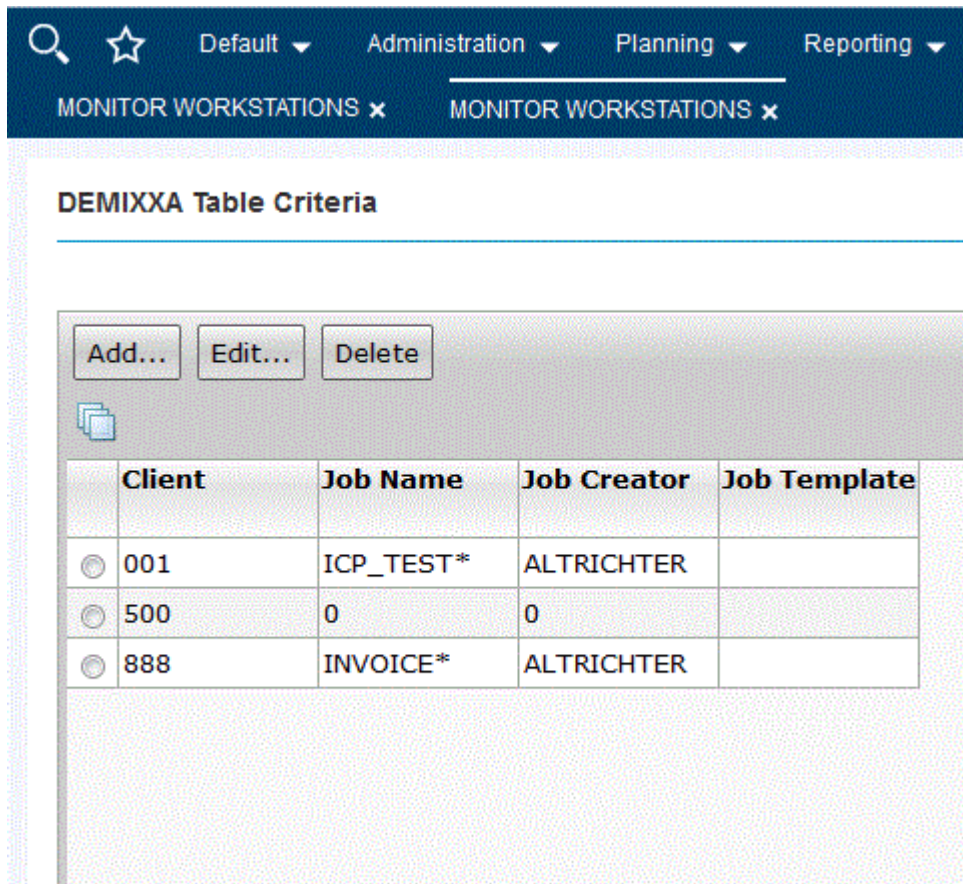
### About this task

To set table criteria with the BC-XBP 2.0 interface on an SAP job using the **Monitor Workload** of the Dynamic Workload Console, follow these steps:

1. Log in to the Dynamic Workload Console.
2. From the **Monitoring and Reporting** menu, click **Monitor Workload**.
3. In the **Monitor Workload** window select the engine, enter **Workstation** in the **Object Type** field, and select the plan to display the list of workstations you want to monitor. Click **Run**.
4. Select an extended agent workstation in the table of displayed workstations, and click **More Actions > Table Criteria...** from the toolbar.
5. The **Table Criteria** panel displays. From this panel you can add, delete, edit, or refresh criteria.



Figure 10. The Table Criteria panel



## 6. Specify the criteria:

- a. In **Client**, specify the client workstation of the SAP job.
- b. In **Job Name**, specify a filter to match a set of SAP jobs. Use the asterisk (\*) wildcard character to match a set of jobs.
- c. In **Job Creator**, specify a filter to match a set of SAP job creator. Use the asterisk (\*) wildcard character to match a set of jobs.
- d. Optionally, in **Job Template**, specify the template file that contains instructions for the interception collector about how to run the intercepted SAP job under control of IBM Workload Scheduler. For more information about template files, see [Using template files on page 227](#).
- e. In **Job Class**, specify the class assigned to the job that represents the priority with which the job runs on the SAP system.

7. Click **OK**.

## Setting SAP criteria in the job interception criteria profile

Setting criteria to intercept jobs and relaunch them.

### About this task

To set the criteria that defines which SAP jobs to intercept and relaunch with the BC-XBP 3.0 interface using the Dynamic Workload Console, perform the following steps:

1. In the Navigation bar at the top, click **Design > SAP > Manage SAP Criteria Profiles**.
2. In **Workstation name**, type the name of the workstation where the SAP job runs. This is the workstation with the r3batch access method that communicates with the remote SAP system. If you do not know the name of the workstation, click the **Lookup Workstations** icon to enter your filter criteria and click **Search**. If you enter a string representing part of the workstation name, it must be followed by the asterisk (\*) wildcard character. Both the question mark (?) and asterisk (\*) are supported as wildcards. You can also simply use the asterisk wildcard character (\*) to display all workstations. Optionally, specify any of the other search criteria available and click **Search**.

#### Result



From the results displayed, select the workstation and click **OK**.

3. From the Criteria Manager main view, click **New** to create a criteria profile.
4. Select **Interception** as the type of criteria profile you want to create.
5. Enter descriptive text that enables you to easily identify the criteria profile in the table of criteria profiles. Avoid using special characters such as, <(less than), > (greater than), or the ' (apostrophe) in this field.
6. Click **Save**.

#### Result


The criteria profile is displayed in the list of criteria profiles and it is not yet active.


7. On the **Details** tab in the upper-right pane, define the criteria that intercepted jobs must match. For example, to intercept jobs with a job name beginning with "ICP", specify the following criteria:

- a. Click  to define a new criterion.
- b. In **Description**, type `Criterion 1`.
- c. In **JOB NAME**, click  to specify the value for the JOB NAME field.
- d. Leave the default value **Select** to indicate to use the selection criterion specified when intercepting jobs.
- e. In **Options**, select **Pattern** and in **Single Value or Lower Limit**, type `ICP*`.

#### Result

This sets the condition for the job name.

- f. Click **Save** to save the criterion definition.
8. Define the criteria that must be matched to relaunch intercepted jobs. Click the **Job Relaunch Criteria** tab.
  - a. Click  to define a new criteria that determines which jobs are relaunched.
  - b. In **Client**, specify the client workstation of the SAP job.
  - c. In **Job Name**, specify a filter to match a set of SAP jobs. Use the asterisk (\*) wildcard character to match a set of jobs.
  - d. In **Job Creator**, specify a filter to match a set of SAP job creator. Use the asterisk (\*) wildcard character to match a set of jobs.

- e. Optionally, in **Job Template**, specify the template file that contains instructions for the interception collector about how to run the intercepted SAP job under control of IBM Workload Scheduler. For more information about template files, see [Using template files on page 227](#).
  - f. In **Job Class**, specify the class assigned to the job that represents the priority with which the job runs on the SAP system.
9. Click **OK**.
  10. You can continue to define more criteria and then save the criteria profile.
  11. When you are done defining the criteria, save the criteria profile.
  12. Select the criteria profile and then click **Activate** from the toolbar. 

## Results

The status of the criteria profile is updated to show that it is now active. The criteria profile can now begin to intercept jobs according to the specifications of the criteria hierarchy and relaunch them as defined in the IBM Workload Scheduler job. If another criteria profile of the same criteria type was active, its status changes to inactive.

## Using template files

### About this task

A template is a file with extension `.jdf` located in the same directory as the interception criteria file (`TWA_DATA_DIR/methods/r3batch_icp`). The template file contains instructions for the interception collector about how to run the intercepted SAP job under control of IBM Workload Scheduler. Its syntax corresponds to the syntax of `docommand` in `conman`. You can use any text editor to maintain this file. Ensure that the user, `LJUser`, is able to read and write to this file.

If the user template file is empty, a template file named `default.jdf` is used. If `default.jdf` does not exist, the following instructions are used:

```
alias=SAP_$RUN_$JOBNAME_$JOBBCOUNT
```

This means that the intercepted SAP jobs are to be restarted immediately, because of the absence of the `at=` job option. Their IBM Workload Scheduler names are composed of the string `SAP_`, the current run number of the interception collector, and the name and ID of the SAP job.

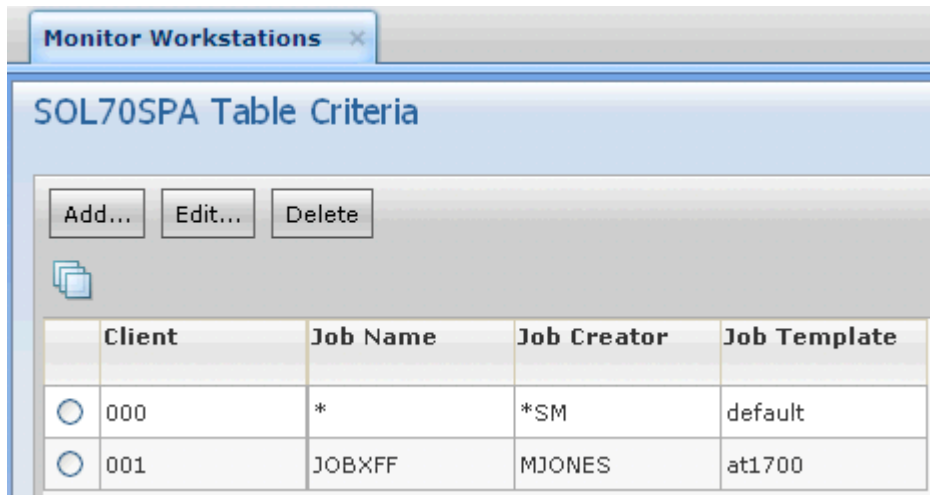
The instruction set for restarting an intercepted SAP job is retrieved in the following order:

1. From the template file, if an existing template is specified in the interception criteria file.
2. From the default template file, if the template is specified in the interception criteria file but does not exist, or if the template is not specified in the interception criteria file.
3. From the default instruction set, if the default template file does not exist.

## Job interception example

The following example demonstrates how different template files can be used to determine when an intercepted SAP job is restarted. The interception criteria table contains the following entries:

Figure 11. The Table Criteria panel



The table criteria specified, implies the following:

#### Client 000

All jobs started in client `000` by SAP users whose user name begins with `sm`, will be intercepted. The interception collector restarts the jobs using the instructions from the default template file `default.jdf`. If the default template file does not exist, then the SAP jobs are restarted immediately as specified in the default instruction set:

```
alias=SAP_$RUN_$JOBNAME_$JOBCOUNT
```

#### Client 001

The job named, `JOBXFF`, started in client `001` by SAP user named, `MJONES`, will be intercepted. The interception collector restarts the jobs using the instructions from the template file `at1700.jdf`. The SAP jobs are restarted at 17:00 with a random name, because of the `alias` command. The template file `at1700.jdf` contains the following entry:

```
alias;at=1700
```

## Using placeholders

In the template files you can use a number of placeholders that are replaced by the interception collector at run time. They are listed in [Table 38: Placeholders for job interception template files on page 228](#).

**Table 38. Placeholders for job interception template files**

| Placeholder | Description   |
|-------------|---|
| \$CPU       | Name of the extended agent workstation where the interception collector runs. |
| \$CLIENT    | Client number of the intercepted SAP job.                                     |
| \$JOBNAME   | Name of the intercepted SAP job.  |
| \$JOBCOUNT  | Job ID of the intercepted SAP job.  |

**Table 38. Placeholders for job interception template files (continued)**

| Placeholder | Description                                       |
|-------------|---|
| \$USER      | Name of the user who launched the SAP job.        |
| \$JOBNUM    | Job number of the interception collector.         |
| \$RUN       | Current run number of the interception collector. |
| \$SCHED     | Schedule name of the interception collector.      |
| \$RAND      | Random number.                                    |

The template:

```
alias=ICP_$RAND_$JOBNAME_$JOBCOUNT_$CLIENT;at=1000
```

instructs the interception collector to restart the SAP job named `DEMO_JOB` with job ID `12345678` on client `100` at `10:00` as IBM Workload Scheduler job `ICP_1432_DEMO_JOB_12345678_100`.

## Activating the job interception feature

Activate the job interception feature for the appropriate BC-XBP interface.

### About this task

To enable the job interception feature: .

1. Run ABAP report `INITXBP2`.

#### Result

This report shows you the current status of the job interception and parent-child features, and allows you to toggle the status of both features.

2. Select the BC-XBP interface version as appropriate:
  - **Activate 3.0**
  - **Activate 2.0**
3. Save the changes.

## The parent-child feature

In some situations, an SAP job dynamically spawns a number of other jobs; for example, to distribute the workload to the free application servers. Prominent examples are the mass activity jobs of the SAP `FI-CA` component. Before BC-XBP 2.0, it was difficult for external schedulers to handle this situation, because the business process does not usually end with the end of the initial job (parent job), but with the end of all subjobs (child jobs).

The BC-XBP 2.0 interface allows you to determine if a job has launched subjobs, together with their names and IDs, and so it is now possible to track them.

To activate this feature, use the `INITXBP2` ABAP report, which you can also use to toggle the status of job interception.

When the parent-child feature is active, IBM Workload Scheduler considers an SAP job as finished only after all its child jobs have ended. The status of the IBM Workload Scheduler job remains as `EXEC` while the parent job or any of its child jobs are running.

The status of the IBM Workload Scheduler job becomes `SUCC` if the parent job and all child jobs end successfully. If any of the jobs ended with an error, the status of the IBM Workload Scheduler job becomes `ABEND`.



**Note:** The parent-child feature can interfere with job interception because, although the parent job cannot be intercepted, any of its child jobs can be intercepted if they match the interception criteria. In this case, the IBM Workload Scheduler job remains in the `EXEC` status until the intercepted child job has been relaunched and has ended.

The joblogs of the child jobs are appended in the IBM Workload Scheduler `stdlist` after the joblog of the parent job.

## Using Business Information Warehouse

Business Information Warehouse (BIW) is a data warehouse solution tailored to SAP.

Business Information Warehouse (BIW) allows business reporting and decision support.

To use the InfoPackages component, you must have the SAP Business Warehouse Systems, version 2.0B or later installed.

To use the Process Chains component, you must have the SAP Business Warehouse Systems, version 3.0B or later installed.

The Support Package 9 (SAPKW31009) for SAP Business Warehouse version 3.1 is required so that `SAP` can launch process chains.

## Business Warehouse components

SAP supports two main Business Warehouse components, InfoPackages and Process Chains.

An InfoPackage is the entry point for the loading process from a specific **InfoSource** (a logical container of data source, generically named **InfoObject**). Technically, an InfoPackage is an SAP job whose aim is to load data. Like any other SAP job, it contains job-specific parameters such as start time, and dependencies.

A Process Chain is a complex chain of different processes and their relationships. The processes within a process chain are not limited to data load processes, or InfoPackages, but also include:

- Attribute/Hierarchy Change run
- Aggregate rollup
- ABAP program
- Another process chain
- Customer build process

## Defining user authorizations to manage SAP Business Warehouse InfoPackages and process chains

What you need to use SAP R/3 Business Warehouse InfoPackages and process chains.

Access method for SAP can manage SAP Business Warehouse InfoPackages and process chains. To use the SAP Business Warehouse functions, you must define an IBM Workload Scheduler user within SAP with full authorization for the ABAP Workbench object S\_DEVELOP.

The user must also belong to the following profiles:

- S\_BI-WHM\_RFC (for Business Information Warehouse version 7.0, or later)
- S\_RS\_ALL
- Z\_MAESTRO

## Managing SAP Business Warehouse InfoPackages and process chains

You can manage existing InfoPackages and process chains on SAP systems from SAP.

Business Warehouse InfoPackages and process chains can only be created from the SAP environment. However, the Dynamic Workload Console supports pick lists of InfoPackages and process chains, so that you can also define IBM Workload Scheduler jobs for these existing objects.

You can create IBM Workload Scheduler job definitions that map to SAP jobs that already exist on SAP systems in the following environments:

- Distributed
- z/OS

The SAP jobs can run on extended agent workstations, dynamic agent workstations, dynamic pools, and z-centric workstations depending on the type of job definition you choose to create.

This section describes how to perform tasks such as creating the IBM Workload Scheduler job definitions that map to SAP jobs, how to display the details of these jobs, and how to rerun a process chain job.

## Creating an IBM Workload Scheduler job that contains InfoPackages or process chains

Creating a job with InfoPackages or process chains.

### About this task

This section describes how to create an IBM Workload Scheduler SAP job definition that references a Business Warehouse InfoPackage or Process Chain SAP job.

SAP job definitions can be created using both a distributed or z/OS engine and they can be scheduled to run on the following workstations with the r3batch access method:

- An IBM Workload Scheduler extended agent workstation. A workstation that is hosted by a fault-tolerant agent or master workstation.
- A dynamic agent workstation.
- A dynamic pool.
- A z-centric workstation.

Refer to the Dynamic Workload Console online help for a complete description of all UI elements for both engine types and all supported workstation types.

Take into consideration that:

- To be able to schedule InfoPackages using IBM Workload Scheduler, the scheduling options of the InfoPackage must have:
  - Start type set to **Start later in background process**.
  - Start time set to **Immediate**.
- To be able to control process chains using IBM Workload Scheduler, the scheduling options of the process chain must be **Start Using Meta Chain or API**. If the process chain is set to **Direct Scheduling**, it starts immediately when activated in the SAP system or transported to another SAP system.
- If you are using an operating system that does **not** support Unicode, set the **TWSXA\_LANG** option. For details about the operating systems that support Unicode, see [Unicode support on SAP on page 141](#). For details about the **TWSXA\_LANG** option, see [Setting National Language support options on page 287](#).

You can create a SAP job definition to reference an InfoPackage or process chain using the Dynamic Workload Console.

The following procedure creates an IBM Workload Scheduler SAP job definition and references an InfoPackage or process chain in the IBM Workload Scheduler database:

1. Click **IBM Workload Scheduler > Design > Manage Workload Definitions**.
2. Select a an engine. The **Workload Designer** is displayed.
3. From the Working List pane, click:
  - z/OS engine: **New > ERP**
  - Distributed engine: **New > Job Definition > ERP**
4. Select the SAP job definition in accordance with the engine and type of agent on which the job runs.

#### **z/OS engine**

##### **SAP**

This job definition references an existing job on the SAP system and can run on dynamic agent workstations, dynamic pools, and z-centric workstations.

#### **Distributed engine**

##### **SAP Job on Dynamic Workstations**

This job definition can run on dynamic agent workstations, dynamic pools, and z-centric workstations.

##### **SAP Job on XA Workstations**

This job definition can run on extended agent workstations. A workstation that is hosted by a fault-tolerant agent or master workstation.

5. In the Workspace pane, specify the properties for the job definition you are creating using the tabs available. The tabs for each type of SAP job definition are similar, but there are some differences depending on the type of engine you



selected and the type of workstation on which the job runs. For more detailed information about the UI elements on each tab, see the Dynamic Workload Console online help.

The **General** page requires information regarding the workstation that connects to the remote SAP system. If a default SAP connection is already configured, then these fields are already prefilled, otherwise, you can specify the required information on the General page or you can configure a default connection to be used each time it is required in a definition, see [Setting the SAP data connection on page 173](#) for more information.

On the **Task** page, in **Subtype**, specify either **BW Process Chain** or **BW InfoPackage**.

6. Click **Save** to add the SAP job definition to the IBM Workload Scheduler database.

## Task string to define Business Warehouse InfoPackages and process chain jobs

This section describes the task string parameters that control the running of the Business Warehouse InfoPackages and process chain jobs. You must specify them in the following places when you define their associated IBM Workload Scheduler jobs:

- If you use the Dynamic Workload Console, in the **SAP command line** field of the Task page of the SAP job definition panel.
- As arguments of the `scriptname` keyword in the job definition statement, if you use the IBM Workload Scheduler command line.
- As arguments of the `JOBCMD` keyword in the `JOBREC` statement in the `SCRIPTLIB` of IBM Z Workload Scheduler, if you are scheduling in an end-to-end environment.

The string syntax is the following:

### Job definition syntax

```
-job job_name -i {ipak_ | pchain_} [ -debug ] [ -trace ] [ -flag {imm | immed} ] [ -flag {enable_pchainlog |
disable_pchainlog} ] [ -flag {enable_ipaklog | disable_ipaklog} ] [ -flag {level_all_pchainlog | level_n_pchainlog} ]
[ -flag {pchainlog_chains_only | pchainlog_chains_and_failed_proc | pchainlog_complete} ] [ -flag {
enable_pchainlog_bapi_msg | disable_pchainlog_bapi_msg} ] [ -flag {enable_pchain_details | disable_pchain_details} ] [
-flag {pchain_rerun | pchain_restart | pchain_refresh} ]
```

The parameters are described in [Table 33: Task string parameters for SAP jobs on page 180](#).

**Table 39. Task string parameters for SAP jobs**

| Parameter            | Description   | GUI Support |
|----------------------|---|-------------|
| -job <i>job_name</i> | The name of the task to be run. It is either an InfoPackage technical field name, or a process chain name. This parameter is mandatory. | ✓           |
| -i {ipak_   pchain_} | One of the following:   | ✓           |

Table 39. Task string parameters for SAP jobs (continued)

| Parameter                                    | Description  | GUI Support |
|--|--|-------------|
|  | <b>ipak_</b><br>Target job is an InfoPackage   |             |
|  | <b>pchain_</b><br>Target job is a process chain  |             |
| -debug                                       | Turns on the most verbose <code>r3batch</code> trace. This option is for debugging the extended agent and should not be used in standard production.   | ✓           |
| -trace                                       | Turns on the <code>SAP RFC</code> trace.<br><br>When you use this option, a trace file is created in the IBM Workload Scheduler <code>methods</code> directory. In UNIX, this trace file is called <code>dev_rfc</code> . In Windows, the file is called <code>rfcXXXXX_XXXXX.trc</code> . The <code>methods</code> directory is located in:<br><br><b>On UNIX operating systems</b><br><br><code>TWA_DATA_DIR/methods</code><br><br><b>On Windows operating systems</b><br><br><code>TWA_home\methods</code><br><br>This option is for debugging the extended agent and should not be used in standard production. Ensure that you delete the trace option from the job after you have performed debug procedures. The trace file can become very large and unmanageable. | ✓           |
| -flag {imm   immed}                          | Specifies to launch the job immediately, meaning that if there are no spare work processes, the job fails.   | ✓           |
| -flag {enable_pchainlog   disable_pchainlog} | Enables or disables retrieval and appending of the process chain job log in the IBM Workload Scheduler <code>stdlist</code> . Disable if the size of the log affects performance. A related configuration option can be set for this purpose at a more general level. See <a href="#">Table 31: r3batch common configuration options on page 151</a> .   | ✓           |
| -flag {enable_ipaklog   disable_ipaklog}     | Enables or disables retrieval and appending of the InfoPackage job log in the IBM Workload Scheduler <code>stdlist</code> . Disable if the size of the log affects performance. A related configuration option can be set for this purpose   |             |

Table 39. Task string parameters for SAP jobs (continued)

| Parameter   | Description  | GUI Support |
|---|--|-------------|
| -flag {level_n_pchainlog   level_all_pchainlog}                                       | <p>at a more general level. See <a href="#">Table 31: r3batch common configuration options on page 151</a>.</p> <p>Allows for retrieval of process chain logs down to the process chain level you specify.</p> <p><b>level_n_pchainlog</b></p> <p>Specifies that the process chains are logged down to, and including, the level represented by number <i>n</i>.</p> <p><b>level_all_pchainlog</b></p> <p>Specifies that all the process chains are logged.</p> <p>The default is <code>level_1_pchainlog</code>.</p> <p>A related configuration option can be set for this purpose at a more general level. See <a href="#">Table 31: r3batch common configuration options on page 151</a>.</p> |             |
| -flag {pchainlog_chains_only   pchainlog_chains_and_failed_proc   pchainlog_complete} | <p>Specifies what type of process chain-related logs will be retrieved.</p> <p><b>pchainlog_chains_only</b></p> <p>Only the process chains are logged.</p> <p><b>pchainlog_chains_and_failed_proc</b></p> <p>In addition to the process chains, all the processes that failed are also logged.</p> <p><b>pchainlog_complete</b></p> <p>The process chains and all processes are logged.</p> <p>The default is <b>pchainlog_complete</b>.</p> <p>A related configuration option can be set for this purpose at a more general level. See <a href="#">Table 31: r3batch common configuration options on page 151</a>.</p>  |             |

**Table 39. Task string parameters for SAP jobs (continued)**

| Parameter  | Description  | GUI Support |
|--|--|-------------|
| -flag {enable_pchainlog_bapi_msg   disable_pchainlog_bapi_msg} | Enables or disables retrieval of additional messages from the BAPI calls from the SAP Business Warehouse process chains and appends them to the IBM Workload Scheduler <code>stdlist</code> .  |             |
| -flag {enable_pchain_details   disable_pchain_details}         | Enables or disables the display of details about the process chain job. A related configuration option can be set for this purpose at a more general level. See <a href="#">Table 31: r3batch common configuration options on page 151</a> . | ✓           |
| -flag {pchain_rerun   pchain_restart   pchain_refresh}         | Determines the action that IBM Workload Scheduler performs when you rerun a job that submits a process chain.  | ✓           |
|  | <b>pchain_rerun</b>  |             |
|  | IBM Workload Scheduler creates another process chain instance and submits it to be run again.  |             |
|  | <b>pchain_restart</b>  |             |
|  | IBM Workload Scheduler restarts the original process chain from the failing processes to the end.  |             |
|  | <b>pchain_refresh</b>  |             |
|  | IBM Workload Scheduler updates the status and details of the original process chain.   |             |
|  | For more details about rerunning a process chain, refer to <a href="#">Rerunning a process chain job on page 239</a> .   |             |



**Note:** Typically, the `-debug` and `-trace` options are for debugging the extended agent and should not be used in standard production.

The following is an example for an InfoPackage job whose technical field name is `ZPAK_3LZ3JRF29AJDQM65ZJBJF50MY`:

```
-job ZPAK_3LZ3JRF29AJDQM65ZJBJF50MY -i ipak_
```

## Displaying details about Business Warehouse InfoPackages

### About this task

To display details about a Business Warehouse InfoPackage, perform the following steps:

1. Open the **Workload Designer**, from the portfolio, click **IBM Workload Scheduler > Design > List Jobs on SAP**.
2. In **Engine name**, select the name of the IBM Workload Scheduler engine connection from which you want to view SAP job details.
3. In **SAP Job Type**, select **Business Warehouse InfoPackage**.
4. In **Workstation name**, specify the workstation where the SAP job runs. If you do not know the object name, click the ... (Browse) button. In the **Name** and **Location** panel, enter some characters of the object name (asterisk is supported as a wildcard) and click **Start**. From the displayed list, select the workstation you want to use, and click **OK**.
5. Click **Display**. The list of available jobs of type Business Warehouse InfoPackage for the specified engine is displayed.
6. Select the job for which you want to display the details and click **Details**.
7. When you have finished viewing the details for the job, click **OK** to return to the list of SAP jobs on the workstation specified.

## Displaying details about a process chain job

You can view the details for a process chain job including any local subchains contained in the process chain.

### Before you begin

Ensure you have performed the following steps before running this procedure:

- Set the **pchain\_details** option to **ON** in the common options file. For more information about this option, refer to [Defining the common options on page 150](#).
- In a distributed environment, customize the Browse Jobs tasks that you created *before* installing IBM Workload Scheduler 8.4 Fix Pack 1 to show the **Job Type** column. For details about how to customize the task properties, refer to the Dynamic Workload Console online help.
- In a z/OS environment, you must customize the task properties to display the **Advanced Job Type** column that indicates the job type. For details about how to customize the task properties, refer to the Dynamic Workload Console online help.

### About this task

To display details about an SAP Process Chain that you scheduled as an IBM Workload Scheduler job, perform the following steps from the Dynamic Workload Console.

1. Click **Monitoring and Reporting > Workload Monitoring > Monitor Workload**.
2. In **Engine name**, select the name of the IBM Workload Scheduler engine connection from where you want to work with SAP jobs.
3. In **Object Type**, leave the default selection **Job**.
4. Click **Run**.
5. The table of results corresponding to the search criteria is displayed:

Figure 13. Dynamic Workload Console - Table of results

Monitor Jobs [x] [--- Select Action ---]

Close Plan Name: Current Plan

Job Log... Dependencies... Release Dependencies Rerun... Show Rerun Instances More Actions Graphical Views

| Status  | Internal Status | Job            | Job Type          | Workstation (Job) | Job Stream |
|---|-----------------|----------------|-------------------|-------------------|------------|
| <input type="checkbox"/> <input checked="" type="checkbox"/> Successful | SUCC            | PC_-1967534151 | SAP Process Chain | W6470AGE          | JOBS       |
| <input type="checkbox"/> <input checked="" type="checkbox"/> Successful | SUCC            | PC_301475144   | SAP Process Chain | W6470AGE          | JOBS       |
| <input type="checkbox"/> <input checked="" type="checkbox"/> Successful | SUCC            | PC_-109893088  | SAP Process Chain | W6470AGE          | JOBS       |
| <input type="checkbox"/> <input checked="" type="checkbox"/> Error      | ABEND           | PC_-1347740193 | SAP Process Chain | W6470AGE          | JOBS       |
| <input type="checkbox"/> <input checked="" type="checkbox"/> Error      | ABEND           | PC_646387164   | SAP Process Chain | W6470AGE          | JOBS       |
| <input type="checkbox"/> <input checked="" type="checkbox"/> Error      | ABEND           | PC_-1513805554 | SAP Process Chain | W6470AGE          | JOBS       |
| <input type="checkbox"/> <input checked="" type="checkbox"/> Error      | ABEND           | PC_1682550152  | SAP Process Chain | W6470AGE          | JOBS       |
| <input type="checkbox"/> <input checked="" type="checkbox"/> Error      | ABEND           | PC_-573813697  | SAP Process Chain | W6470AGE          | JOBS       |
| <input type="checkbox"/> <input checked="" type="checkbox"/> Successful | SUCC            | PC_2145163497  | SAP Process Chain | W6470AGE          | JOBS       |
| <input type="checkbox"/> <input checked="" type="checkbox"/> Successful | SUCC            | PC_-1340397696 | SAP Process Chain | W6470AGE          | JOBS       |
| <input type="checkbox"/> <input checked="" type="checkbox"/> Successful | SUCC            | PC_-355196273  | SAP Process Chain | W6470AGE          | JOBS       |
| <input type="checkbox"/> <input checked="" type="checkbox"/> Successful | SUCC            | PC_1301210520  | SAP Process Chain | W6470AGE          | JOBS       |

Lines per page: 25 1 << 2 >> 6 Total: 128 Selected: 0

6. Select a process chain job. For each process chain job, a hyperlink named **SAP Process Chain** is displayed.

#### Distributed environment

The **Job Type** column displays **SAP Process Chain** to help you identify SAP process chain jobs.

#### z/OS environment

The **Advanced Job Type** column displays **SAP Process Chain** to help you identify SAP process chain jobs.

Click the hyperlink for the job whose details you want to display.

7. The details for the process chain are displayed:

Figure 14. Dynamic Workload Console - Details of a process chain job

'PCHAINTEST01' SAP Process Chain

Monitor Jobs > Active Tasks (1) > All Jobs in plan (Distributed) (Owner... > 'PCHAINTEST01' SAP Process Chain

Refresh Close View Expand All Collapse All

'PCHAINTEST01' SAP Process Chain

| Process             | Type    | Link | Status    | Start Time          | End Time            | Description       | ID                        | Process ID |
|---------------------|---------|------|-----------|---------------------|---------------------|-------------------|---------------------------|------------|
| ▼ STARTER_PCHAIN_01 | Start   |      | Completed | 2/13/06 1:15 PM CET | 2/13/06 1:15 PM CET | STRATER PCHAIN 01 | CXX9B4FFSGF7AH8EUL7FH30Q0 | 0          |
| NODELEV2            | Program |      | Completed | 2/13/06 1:15 PM CET | 2/13/06 1:15 PM CET | NODE_02_LEV_01    | BI_PROCESS_ABAP_13154100  | 1          |
| NODELEVE1           | Program |      | Completed | 2/13/06 1:15 PM CET | 2/13/06 1:15 PM CET | NODE_01_LEV_01    | BI_PROCESS_ABAP_13154200  | 2          |

IBM Workload Scheduler monitors the process chain job until the job completes. The details shown reflect the last monitoring process performed. Perform a restart of the process chain indicating a refresh operation to synchronize the details with those on the remote SAP system to have the most updated information possible. If the process chain contains local subchains, a hyperlink is displayed for each one. Click the hyperlink you want, to display details about the corresponding subchain job. Alternatively, you can display the process chain details by clicking the hyperlink for the job and display the job properties panel. Click the hyperlink shown under **SAP Job Details**. The details for the process chain are displayed.

## Rerunning a process chain job

Process chain jobs can be rerun from the start, rerunning the entire process chain, or they can be restarted from a specific process. Restarting a process enables you to restart without rerunning the whole process chain again. You can choose to either restart from the failed processes in a process chain, or restart a specific process indicating the related process ID.

To rerun an SAP job that submits a process chain, you can use one of the following user interfaces:

### conman

For details, refer to the *IBM Workload Scheduler User's Guide and Reference*.

### Dynamic Workload Console

See [Procedure for rerunning a process chain job on page 243](#) for information about performing this task from the console.

For information about rerunning an SAP Standard R/3 job, see [Rerunning a standard SAP job on page 195](#).

In general, when you rerun a process chain job, the new job is assigned the name of the alias you specify. To keep the original job name, set the IBM Workload Scheduler global option **enRetainNameOnRerunFrom** to `yes`. For details about this option, see *IBM Workload Scheduler Administration Guide*.

On extended agents, an alias is mandatory for each action you perform on the process chain job and the action itself, is the prefix of the alias name. For example, if you choose to restart a process chain from the failed processes, and assign PCHAIN1 as the alias for the process chain job, then the new job name is `Restart_PCHAIN1`.

In a z/OS environment, the process chain job maintains the same name and the Monitor Jobs view always displays the status for the last action performed on the job. Every time a rerun is performed on a process chain job, a new instance is generated each with a different ID.



**Note:**

1. By default, if you do not specify any setting, rerunning a process chain job corresponds to submitting a new process chain instance.
2. If you kill an IBM Workload Scheduler job that submits a process chain, the process chain is removed from schedule in the SAP Business Information Warehouse system. To restart the same process chain instance with `r3batch`, you require at least the following SAP Business Information Warehouse versions:
  - 3.0 with SP25
  - 3.1 with SP19
  - 3.5 with SP10
  - 7.0

If your version of SAP Business Information Warehouse is earlier, you can restart the process chain only manually, through the SAP graphical interface.

[Table 40: Actions performed when you rerun a process chain job on page 240](#) shows the action performed when you rerun an IBM Workload Scheduler job that submits a process chain, depending on the settings you specify. These are the actions performed when you submit the rerun operation using the Rerun button from the Monitor Jobs view.

**Table 40. Actions performed when you rerun a process chain job**

| Action performed                                 | Description and setting  |
|--|--|
| <b>A new process chain instance is submitted</b> | <p>IBM Workload Scheduler creates another process chain instance and submits it to be run again. This action occurs when:</p> <ul style="list-style-type: none"> <li>• On extended agents, you specify <code>RERUNvalue</code> as the step to rerun, where <code>value</code> is any value you want. This setting overrides the settings in the job definition and options file, if any.</li> </ul> <p>In an end-to-end environment, you can perform this action on a centralized job by adding the following parameter to the script file:</p> <pre style="background-color: #f0f0f0; padding: 5px;">-flag pchain_rerun</pre> |



Table 40. Actions performed when you rerun a process chain job (continued)

| Action performed   | Description and setting   |
|--|---|
| <b>The original process chain is rerun from the failed processes</b> | <ul style="list-style-type: none"> <li>• In the job definition, you set <code>-flag pchain_rerun</code>. This setting overrides the setting in the options file, if any. For a description of this parameter, see <a href="#">Table 39: Task string parameters for SAP jobs on page 233</a>.</li> <li>• In the options file, you set the <code>pchain_recover</code> option to <code>rerun</code>. For a description of this option, refer to <a href="#">Table 31: r3batch common configuration options on page 151</a>.</li> </ul> <p>IBM Workload Scheduler restarts the original process chain from the failed processes to the end. In this way, after you detected the error that caused the failure and performed the recovery action, you can rerun the process chain job from the failed processes and have its run completed.</p> <p>This action is performed only if at least one process in the process chain did not complete successfully. It occurs when:</p> <ul style="list-style-type: none"> <li>• On extended agents, you specify <code>RESTARTvalue</code> as the step to rerun, where <code>value</code> is any value you want. This setting overrides the settings in the job definition and options file, if any.</li> </ul> <p>In an end-to-end environment, you can perform this action on a centralized job by adding the following parameter to the script file:</p> <pre data-bbox="597 1136 831 1163">-flag pchain_restart</pre> <ul style="list-style-type: none"> <li>• In the job definition, you set <code>-flag pchain_restart</code>. This setting overrides the setting in the options file, if any. For a description of this parameter, see <a href="#">Table 39: Task string parameters for SAP jobs on page 233</a>.</li> <li>• In the options file, you set the <code>pchain_recover</code> option to <code>restart</code>. For a description of this option, refer to <a href="#">Table 31: r3batch common configuration options on page 151</a>.</li> </ul> |
| <b>The process that you specify is restarted</b>                     | <p>IBM Workload Scheduler restarts the process of the original process chain that you specify, and monitors the process chain run until its final state.</p> <p>On extended agents, this action occurs when you specify <code>PROCESSprocessID</code> as the step to rerun, where <code>processID</code> is the identifier of the process you want. For example, if the process ID is <code>3</code>, you must specify <code>PROCESS3</code> as the step.</p> <p>You can view the process IDs in the following ways:</p>  |

**Table 40. Actions performed when you rerun a process chain job (continued)**

| Action performed   | Description and setting   |
|--|---|
| <ul style="list-style-type: none"> <li>Dynamic Workload Console, version 8.5 or later. From the panel where the details about the process chain are displayed, see the column named Process ID. For details about how to display the process chain details, refer to <a href="#">Displaying details about a process chain job on page 237</a>.</li> <li>IBM Workload Scheduler job log, as follows:</li> </ul> | <pre>+++ EEW01071I Start of process chain PCHAIN1 Process Chain PCHAIN1 (Log ID:D3C0ZWAYESD58PXOYPEOGNzk7). ----- Process Type: TRIGGER. Process Variant: PCHAIN1_STARTER. Actual State: F. ... &gt;&gt; <b>Process ID: 3.</b> Process Type: ABAP. Process Variant: Z_PCHAIN1_NODE3. Actual State: F. Instance: D3C0ZXL3IJ8LR509Q1D9A4Y4N.  &gt;&gt; <b>Process ID: 4.</b> Process Type: ABAP. Process Variant: Z_PCHAIN1_NODE1. Actual State: . Instance: D3C0ZZKS0RR88DKRJQ09Z1WW7.  +++ EEW01072I End of process chain PCHAIN1</pre> |

The following list shows the meaning of the alphabetic value used as the actual state in the job log:

| Actual state | Meaning                |
|--------------|------------------------|
| <b>A</b>     | Active                 |
| <b>F</b>     | Completed              |
| <b>G</b>     | Successfully completed |
| <b>P</b>     | Planned                |
| <b>Q</b>     | Released               |

Table 40. Actions performed when you rerun a process chain job (continued)

| Action performed | Description and setting |
|------------------|-------------------------|
| <b>R</b>         | Ended with errors       |
| <b>S</b>         | Skipped                 |
| <b>X</b>         | Canceled                |
| <b>Y</b>         | Ready                   |
| <b>blank</b>     | Undefined               |

In an end-to-end environment, you can perform this action on a centralized job by adding the following parameter to the script file:

```
-pchain_pid processID
```

#### The status and details of the original process chain are updated

IBM Workload Scheduler monitors the original process chain until its final status.

This action occurs when:

- On extended agents, you specify `REFRESHvalue` as the step to rerun, where `value` is any value you want. This setting overrides the setting in the job definition, if any.

In an end-to-end environment, you can perform this action on a centralized job by adding the following parameter to the script file:

```
-flag pchain_refresh
```

- In the job definition, you set `-flag pchain_refresh`. For a description of this parameter, see [Table 39: Task string parameters for SAP jobs on page 233](#).

## Procedure for rerunning a process chain job

You can rerun all of the processes in the process chain from the Dynamic Workload Console or you can rerun at a process level.

### Before you begin

In z/OS environments, you need to set the status of the job to **Ready** before you can rerun the job.

1. Select a job and click **Set Status**.
2. In **Change Status**, select **Ready**.
3. Click **OK** to return to the list of jobs.

### About this task

To rerun a process chain SAP job, perform the following steps:

1. Click **Monitoring and Reporting > Workload Monitoring > Monitor Workload**.
2. In **Engine name**, select the name of the IBM Workload Scheduler engine connection from where you want to work with SAP jobs.
3. In **Object Type**, leave the default selection **Job**.
4. Click **Run**.
5. A list of jobs is displayed. Select a process chain job.

### Distributed environment

The **Job Type** column displays **SAP Process Chain** to help you identify SAP process chain jobs.

### z/OS environment

The **Advanced Job Type** column displays **SAP Process Chain** to help you identify SAP process chain jobs. To display the **Advanced Job Type** column in the table, edit the **Task Properties** and in **Column Definition**, add the **Advanced Job Type** column to the **Selected Columns** list. Move the column up to define the order of the column in the table and make it more visible.

6. Rerun the job.
  - a. Click **More Actions > Restart Process Chain**.
  - b. Select the action you want to perform on the selected process chain:

#### Rerun

Reruns the entire process chain. The process chain ID on the SAP system remains the same, as well as the job identifier on z/OS systems.

Specify an alias to identify the new job. In distributed systems the rerun process chain is identified with this alias name prefixed by `RERUN`.

#### Refresh

Refreshes the Dynamic Workload Console view with the latest updates on the remote SAP system so that the two views are synchronized.

Specify an alias to identify the new job. In distributed systems the refreshed process chain is identified with this alias name prefixed by `REFRESH`.

**Restart from the failed processes**

Action available only for process chains in error state. Rerun only some steps of the process chain, starting from the failed processes.

Specify an alias to identify the new job. In distributed systems the restarted process chain is identified with this alias name prefixed by `RESTART`.

**Restart from a specific process**

Action available only for process chains in error state. Rerun only some steps of the process chain, starting from the process specified in the **SAP Process ID** field. You can find the process ID by opening the job log or viewing the job type details from the table of results of your monitor job task.

In distributed systems the restarted process chain is identified with this alias prefixed by `PROCESS`.

7. Click **OK** to perform the selected action on the process chain.

**Results**

The job reruns immediately.

**Business scenario: rerunning the original process chain job from the failed process**

As a scheduling administrator, you are responsible for managing batch jobs in both SAP and non-SAP systems. The workflow is one or more job streams in IBM Workload Scheduler. A job stream contains jobs that collect and prepare data for month-end closing over all sales channels. The month-end closing report requires data to be collected from several sales and distribution systems. Data is collected using local and remote process chains in the SAP Business Intelligence system. The process chains include a set of Infopackages, ABAP reports, and operating system jobs to sort the report data by a logical hierarchy.

To administer from a single point of control, you link the SAP process chains to IBM Workload Scheduler through IBM Workload Scheduler.

During batch processing, an IBM Workload Scheduler job comprising a process chain, failed. Optionally, you can see which processes failed either from the Dynamic Workload Console (for details, see [Displaying details about a process chain job on page 237](#)) or in the job log. You ask the SAP administrator to fix the cause of the error, then, on an extended agent, you rerun the IBM Workload Scheduler job by setting the step as `RESTARTvalue`. In this way, the original process chain is restarted from the failed processes and continues until the ending step.

Alternatively, you can select the process chain job from the Monitor Jobs view on the Dynamic Workload Console and then select **More Actions > Restart Process Chain** and then select the **Restart from the failed processes** option.

## Business scenario: restarting a specific process of the process chain

You might decide to restart a single process as a preparation step before restarting the failed processes of a process chain. A failed process might have corrupted some data, so you run the single process to restore the data and set up the required system state before you rerun the other processes in the process chain.

Suppose you are using InfoPackages and process chains to extract data from one or several sources and you want to transform this data into managerial reports, for example by using aggregate functions. If the process that transforms this data fails, it might corrupt the data that the preceding InfoPackage process had successfully extracted. After fixing the problem with the transformation process, you must restart the InfoPackage extraction process to reload the data, even though this extraction process had completed successfully before. Restart the failed transformation process only after the data has been reloaded, either by restarting the failed processes of the process chain or by restarting just the failed transformation process.

On an extended agent, from the Monitor Jobs view on the Dynamic Workload Console, select the process chain and click **Rerun**, then specify `PROCESSprocessID` as the step to rerun, where `processID` is the identifier of the process you want to restart.

To restart a specific process of the process chain, from the Monitor Jobs view on the Dynamic Workload Console, select the process chain and click **More Actions > Restart Process Chain** and then select the **Restart from a specific process** option, specifying the process ID in the **SAP Process ID** field.

## Job throttling feature

Learn how the job throttling feature helps you to improve the efficiency of your scheduling on SAP systems and reduce the batch window for your SAP jobs to a minimum.

Using advanced XBP 2.0 and 3.0 functions, such as the job interception and parent-child, the job throttler ensures that the SAP system is not overloaded and the number of released jobs does not exceed the total number of SAP background work processes in the system.

You can also configure the job throttler to send data related to its activity to the SAP Computing Center Monitoring System (CCMS) for monitoring purposes.

## Business scenario

You manage your Internet sales through an application software that verifies that data is correct, checks the availability of the item, and validates the order. To process all the orders received, you scheduled an IBM Workload Scheduler job to run every 12 hours, connect to SAP, and generate a child job for every order to process. Child jobs are in charge of creating shipping bills, checking destination address, and forwarding the orders to the appropriate carrier, thus optimizing the delivery process. A potential overload of the system might occur during peak times, for example over Christmas, and could risk the late delivery of orders, damaging your business. To manage the submission of jobs and activate an advanced management of their priority class (for both parent and child jobs), enable the job throttling feature.

Additionally, you might want to set a policy so that an SAP CCMS alert is raised each time the number of jobs to be released under the control of the job throttler exceeds a certain threshold. To do this, you enable the job throttler to send data to the SAP CCMS monitoring architecture. At job throttler startup, an MTE that monitors the number of jobs to be released by the

job throttler is created. By including the MTE in a monitoring set and specifying the related threshold, you are alerted each time the threshold is exceeded.

## Software prerequisites

To use job throttling, you must have the SAP JCo 3.0.2 libraries or later (`all` and `jar` files) installed in the `<data_dir>/methods/throttling/lib` directory. To download JCo 3.0.x, visit the SAP Service Marketplace web site.

## Setting and using job throttling

The job throttler enqueues intercepted jobs and releases them when the background work processes that they need on the SAP server or SAP server group are available. The queue of intercepted jobs is sorted by scheduling time and priority of SAP jobs. When the SAP parent-child feature is enabled, child jobs inherit their progenitor's priority so that new urgent jobs are run before other planned jobs.

The following sections describe the steps to operate job throttling.

### Step 1. Setting the options in the options file

#### About this task

To define the behavior of the job throttling feature, set the following options in the options file. For detailed information about the options, see [Table 31: r3batch common configuration options on page 151](#).

- `throttling_enable_job_class_inheritance`
- `throttling_enable_job_interception`
- `throttling_interval`
- `throttling_max_connections`
- `throttling_release_all_on_exit`

### Step 2. Enabling and configuring the job interception feature

#### About this task

As a prerequisite, the job throttler requires that the job interception feature is enabled in the SAP system. To enable and configure job interception, follow these steps.



**Note:** Ensure that the job throttling and job interception features are not running at the same time. The job throttler cannot start if interception collector jobs are running.

1. Enable job interception, either automatically or manually, as follows:

#### **Automatic activation (meaning that the job throttler enables the job interception on SAP system)**

In the options file of the workstation with the r3batch access method you are using, set `throttling_enable_job_interception=on` (this is the default).

**Manual activation**

- a. In the SAP system, run the INITXBP2 ABAP program in the transaction `se38` and enable job interception.
- b. In the options file of the workstation with the r3batch access method you are using, set `throttling_enable_job_interception=off`.



**Note:** When you stop the job throttler, the setting for the job interception feature that was previously configured on the SAP system is restored.

2. In the SAP system, configure the job interception criteria as follows:
  - a. Launch the transaction `se16` to access the table TBCICPT1, where the interception settings are maintained.
  - b. Set the job name, creator, and client related to the jobs you want to intercept. To intercept all SAP jobs, specify the wildcard \* (asterisk) for the job name, creator, and client.
  - c. Save your settings and close the dialog.

SAP will intercept all the jobs matching the selection criteria, and the job throttling will release all the jobs that were intercepted.

### Step 3. Enabling job class inheritance

**About this task**

You can configure the job throttler to have the intercepted job inherit the priority class from its progenitor (the top-level job in the hierarchy), if the progenitor class is higher than the intercepted job class. To do this, in the options file set `throttling_enable_job_class_inheritance=on`; this setting automatically enables the parent-child feature on the SAP system.



**Note:** When you stop the job throttler, the setting for the parent-child feature that was previously configured on the SAP system is restored.

### Step 4. Configuring the logging properties

**About this task**

You can configure the trace properties of the job throttler by editing the logging configuration file `jobthrottling.properties` located in `<data_dir>/methods/throttling/properties`.

To configure the trace level, follow the procedure.

1. Set the trace level property. The supported trace levels are: `DEBUG_MIN`, `DEBUG_MID`, and `DEBUG_MAX`, where `DEBUG_MAX` is the most verbose trace level.
2. Save the changes.

**Results**



When making changes to the trace level setting, the changes are effective immediately after saving the .properties file. Other changes might require a restart to make them effective.

### What to do next

You can also configure the name, number, and size of the trace file. By default, the job throttler generates a maximum of 3 files of 5 MB in the `<data_dir>/methods/traces` directory.



**Note:** The job throttler creates the `<data_dir>/methods/traces` directory as soon as it is started.

## Step 5. Starting and stopping the job throttling feature

### About this task

To start job throttling, run the `jobthrottling` executable file related to the operating system you are using. Optionally, you can create an IBM Workload Scheduler job that starts the job throttler.



**Note:** On Windows systems using a single-byte character language, to start job throttling from a command prompt ensure that the DOS shell font is *not* Lucida Console. Ensure also that you set the IBM Workload Scheduler environment by entering the following command:

```
TWA_home\tw_s_env.cmd
```

From a command prompt, enter:

#### UNIX operating systems

```
TWA_home/methods/jobthrottling.sh {XA_Unique_ID|base_options_filename} [-scratch]
```

#### Windows operating systems

```
TWA_home\methods\jobthrottling.bat {XA_Unique_ID|base_options_filename} [-scratch]
```

Where:

#### ***XA\_Unique\_ID***

The unique identifier for the extended agent workstation you are using. See [UNIQUE\\_ID on page 49](#) for details about retrieving the unique identifier for a workstation.

#### ***base\_options\_filename***

For dynamic and z-centric agents, the file name of the options file without the extension, defined on the engine workstation hosting the workstation with the r3batch access method.

#### ***-scratch***

If you enabled the job throttler to send data to CCMS (for details, see [Sending data from job throttling to the CCMS Monitoring Architecture on page 250](#)), the job throttler starts and resets the attribute MTE named `JT total released jobs` to 0. If you do not specify ***-scratch***, the job throttler starts and increments the `JT total released jobs`.

This parameter is optional, and has effect only if the job throttler sent its data to CCMS at least once before.

To know the syntax for the `jobthrottling` command, run the command as follows:

```
jobthrottling -u
```

To stop the job throttler, enter the following command (optionally, you can create an IBM Workload Scheduler job that stops the job throttler):

#### UNIX operating systems

```
TWA_home/methods/stop-jobthrottling.sh {XA_Unique_ID|base_options_filename}
```

#### Windows operating systems

```
TWA_home\methods\stop-jobthrottling.bat {XA_Unique_ID|base_options_filename}
```

Alternatively, you can enter the following command (you must be connected as `TWSUser` and have read and write permissions on the `txt` file):

```
echo shutdown > TWA_home/methods/{XA_Unique_ID|base_options_filename}_jobthrottling_cmd.txt
```

The job throttler stops:

- When the timestamp of `{XA_Unique_ID|base_options_filename}_jobthrottling_cmd.txt` is later than the time when the job throttler started.
- Within the time interval you specified in the `throttling_interval` option.

## Sending data from job throttling to the CCMS Monitoring Architecture

### About this task

You can configure the job throttler to send data related to its activity to the SAP Computing Center Monitoring System (CCMS) for monitoring purposes. Sending data from the job throttler to CCMS is supported if you have at least the SAP Web Application Server 6.20, Support Package 12 installed.

In the options file, set the following options (for details, see [Table 31: r3batch common configuration options on page 151](#)):

```
throttling_send_ccms_data
throttling_send_ccms_rate
```

In this way, at job throttler startup the following monitoring tree elements (MTE) are created:

- A context MTE named **ITWS for Apps**.
- An object MTE with the same name as the IBM Workload Scheduler extended agent where the job throttler is running. This object MTE belongs to the context MTE **ITWS for Apps**.
- The following attribute MTEs:

**JT total released jobs**

The total number of jobs that the job throttler has released since startup. This value depends on the `-scratch` option you set at job throttler startup; for details, see [Step 5. Starting and stopping the job throttling feature on page 249](#).

**JT queue**

The number of enqueued intercepted jobs to be released.

**JT released jobs per cycle**

The number of released jobs in the latest run. This value depends on the `throttling_send_ccms_rate` setting; for details, see [Table 31: r3batch common configuration options on page 151](#).



**Note:** By default `throttling_release_all_on_exit` is set to `ON`, meaning that when you stop the job throttler, all the intercepted jobs are released. However, these jobs are not considered when updating the **JT total released jobs**, **JT queue**, and **JT released jobs per cycle** MTEs.

To begin monitoring, include the MTEs in the monitoring set you want, and set the thresholds to generate an alert.

You can define an IBM Workload Scheduler event rule based on the CCMS alerts; for detailed information, refer to [Defining event rules based on CCMS Monitoring Architecture alerts on page 274](#).

For example, to define an event that monitors the attribute MTE **JT total released jobs**, on the extended agent workstation with unique identifier `SAP_XA`, connected to the SAP system ID `T01`, specify the following information:

**XA Workstation**

`SAP_XA`

**MTE SAP System ID**

`T01`

**MTE Monitoring Context Name**

`ITWS for Apps`

**MTE Monitoring Object Name**

`SAP_XA`

**MTE Monitoring Attribute Name:**

`JT total released jobs`

## Deleting the monitoring tree elements

**About this task**

After you stopped the job throttling feature, if you configured it to send its status data to CCMS, you can delete one or more MTEs that were created. To do this:

1. From the SAP GUI, invoke the transaction `rz20` to display a list of monitor sets.
2. Locate the monitor set named SAP CCMS Technical Expert Monitors, and expand it.
3. Locate the monitor named All Monitor Contexts, and double-click it to open it.
4. From the action menu, select **Extras -> Activate Maintenance Functions**.
5. Locate the MTE named **ITWS for Apps** and select it.
6. Right-click the MTE and select **Delete**. You are prompted to choose one of the delete options.
7. Select the option you want. The MTE is deleted accordingly.



**Note:** Deleting **ITWS for Apps** from the All Monitor Contexts monitor, deletes also all the copies that you might have created in other monitors.

## Exporting SAP factory calendars

This section describes how to export SAP factory calendars into a file format that can be processed by the IBM Workload Scheduler **composer** command line, to add the exported calendar definitions to the IBM Workload Scheduler database.

## Business scenario

### About this task

You might want to configure your IBM Workload Scheduler scheduling activities based on the schedule calendar in your SAP system. To do this, use the `r3batch` export function to export the SAP calendar definitions into a file whose format is compatible with the IBM Workload Scheduler **composer** command line. Based on the parameters you specify, you create a file that contains only the SAP calendar definitions that meet your scheduling requirements. Use this file as input for the **composer add** command, to import the calendar definitions into the IBM Workload Scheduler database. Your IBM Workload Scheduler and SAP calendars are now synchronized.

To keep the IBM Workload Scheduler and SAP calendar definitions synchronized and avoid duplicating data maintenance in the two environments, you can schedule to export the calendar definitions from SAP and import them to IBM Workload Scheduler on a regular basis using a dedicated job.

## Exporting and importing SAP factory calendars

Refer to the following sections:

- [Exporting factory calendars on page 253](#) for an explanation about how you use the **r3batch** export function to access and download factory calendars available in an SAP system. The main purpose of this function is to create an output file that can be used by the **composer** to synchronize IBM Workload Scheduler calendars with existing SAP factory calendars, integrating the calendar definitions from SAP into IBM Workload Scheduler.
- [Importing factory calendars on page 255](#) for an explanation about how you import the exported calendar definitions into the IBM Workload Scheduler database.

For details about the IBM Workload Scheduler calendar definitions, see *User's Guide and Reference*.

## Exporting factory calendars

### About this task

To export an SAP calendar, from `TWA_home/methods` (where `TWA_home` is the complete path where you installed IBM Workload Scheduler) enter the following command:

### Command syntax

```
r3batch -t RSC -c XA_Unique_ID -- " -calendar_ID calendarID -year_from yyyy -year_to yyyy [ { -getworkdays | -getfreedays } ] [ -tws_name tws_cal_name ] [ -tws_description tws_cal_desc ] [ -filename output_filename ] "
```

Where:

#### **-t RSC**

The identifier of the task to be performed, in this case RSC (Retrieve SAP Calendars). This parameter is required.

#### **-c XA\_Unique\_ID**

The unique identifier for the extended agent workstation connected to the SAP system where the calendar data to export is located. The SAP system must be configured as a workstation to IBM Workload Scheduler. This parameter is required. For information about retrieving the unique identifier for the extended agent workstation, see [UNIQUE\\_ID on page 49](#).

#### **-calendar\_id calendarID**

The identifier of the SAP calendar to be exported, which consists of two alphanumeric characters. This parameter is required.

#### **-year\_from yyyy**

The year of the calendar from when to start exporting dates, in the format yyyy. This parameter is required.

#### **-year\_to yyyy**

The year of the calendar when to stop exporting dates, in the format yyyy. This parameter is required.

#### **-getworkdays | -getfreedays**

Specify `getworkdays` to create the IBM Workload Scheduler calendar definition based on the working days of the SAP calendar. In this way, each date of a working day is stored in the output file.

Specify `getfreedays` to create the IBM Workload Scheduler calendar definition based on the holidays of the SAP calendar. Each date of a non-working day is stored in the output file.

These parameters are optional and mutually exclusive. If you do not specify either, the default is `getworkdays`.

#### **-tws\_name tws\_cal\_name**

The IBM Workload Scheduler name for the exported SAP factory calendar. It is stored in the output file.

You can specify up to eight alphanumeric characters. This parameter is optional, the default is `SAPXX_calendarID`, where:

**XX**

Corresponds to WK if the calendar includes only working days or FR if the calendar includes only non-working days.

**calendarID**

The identifier of the SAP calendar.

For example, the default IBM Workload Scheduler name for an exported calendar, whose identifier is 04, that includes only working days, is SAPWK\_04.

**-tws\_description tws\_cal\_desc**

The description of the IBM Workload Scheduler calendar. It is stored in the output file. You can specify up to 120 alphanumeric characters. If the description contains blanks, it must be enclosed between single quotes. This parameter is optional.

**-filename output\_filename**

The name of the output file that is to contain the calendar definitions. This file is written in a scheduling language that can be processed by the **composer** when you add the calendar data to the IBM Workload Scheduler database.

You can specify a file name with its complete or partial path; if you do not specify any path, the file is created in the current directory. If the path you specify does not exist, it is created, provided that you have the appropriate access rights. Otherwise, the command returns an error message and is not performed.

You can specify up to the maximum number of characters allowed by your operating system. If the name of the file contains blanks, it must be enclosed between single quotes. If another file with the same name exists, it is overwritten.

This parameter is optional. The default value is *tws\_name.txt*, where *tws\_name* is the value you set for the *tws\_name* parameter.

The following is an example of an SAP factory calendar export command:

```
r3batch -t RSC -c horse10 -- " -calendar_id 01 -year_from 2007
-year_to 2010 -tws_name CAL1 -tws_description 'SAP Calendar 01'
-getworkdays -filename 'my dir/calendar_01.dat' "
```

This command exports the SAP calendar named 01, located on the SAP system named horse10. The dates exported begin from year 2007, until year 2010, considering only working days. The IBM Workload Scheduler name used for the calendar is CAL1, and the description written in the output file is SAP Calendar 01. The output file is named *calendar\_01.dat*, stored in *<data\_dir>/methods/my\_dir*, and its content looks like the following

```
$CALENDAR
CAL1
"SAP Calendar 01"
01/02/2007 01/03/2007 01/04/2007 01/05/2007 01/08/2007 01/09/2007 01/10/2007
01/11/2007 01/12/2007 01/15/2007 01/16/2007 01/17/2007 01/18/2007 01/19/2007
01/22/2007 01/23/2007 01/24/2007 01/25/2007 01/26/2007 01/29/2007 01/30/2007
```

```
01/31/2007 02/01/2007 02/02/2007 02/05/2007 02/06/2007 02/07/2007 02/08/2007
.....
11/24/2010 11/25/2010 11/26/2010 11/29/2010 11/30/2010 12/01/2010 12/02/2010
12/03/2010 12/06/2010 12/07/2010 12/08/2010 12/09/2010 12/10/2010 12/13/2010
12/14/2010 12/15/2010 12/16/2010 12/17/2010 12/20/2010 12/21/2010 12/22/2010
12/23/2010 12/24/2010 12/27/2010 12/28/2010 12/29/2010 12/30/2010 12/31/2010
```

## Importing factory calendars

### About this task

To import the exported calendar definitions into the IBM Workload Scheduler database, copy the output file from the extended agent for SAP to the master workstation and from the **composer** command line on the master workstation, enter the following command:

```
-add output_filename
```

where `output_filename` is the name of the exported file, with its complete path.

For example, to import the `twc_calendar_01.dat` file exported in the previous example, copy the file to the master workstation. From the **composer** command line on the master workstation, enter:

```
-add TWA_home/methods/my_dir/twc_calendar_01.dat
```

where `TWA_home` is the complete path where you installed IBM Workload Scheduler.

## Defining internetwork dependencies and event rules based on SAP background events

This section describes how to define internetwork dependencies and event rules for IBM Workload Scheduler based on SAP background events.



**Note:** To be able to define and monitor event rules, you must configure your environment as described in [Configuring SAP event monitoring on page 165](#).

## Defining internetwork dependencies based on SAP background events

Dependencies are prerequisites that must be satisfied before a job or job stream can start. Internetwork dependencies are dependencies checked by the extended agent workstation to which they belong. In response to an internetwork dependency, the SAP extended agent checks for the occurrence of the SAP background event specified in the dependency. As soon as the SAP event is raised, the SAP extended agent commits the event and instructs IBM Workload Scheduler to resolve the corresponding internetwork dependency.

For more details about internetwork dependencies, refer to the *IBM Workload Scheduler: User's Guide and Reference*. For more details about how to raise SAP events, see [Raising an SAP event on page 193](#).

To define SAP background events as internetwork dependencies, XBP versions 2.0 and 3.0 are supported, with the following differences:

**XBP version 2.0**

SAP background events can release IBM Workload Scheduler internetwork dependencies only if the dependencies are created or checked *before* the SAP event is raised. An event history is ignored, therefore an SAP event raised before the internetwork dependency is created, is not considered.



**Note:** Because an SAP event history is ignored, for each SAP background event to be checked, a placeholder SAP job is created. This is a dummy job whose running depends on the SAP background event, therefore an SAP event is considered raised as soon as the corresponding placeholder job has completed.

**XBP version 3.0 (supported by SAP NetWeaver 7.0 with SP 9, or later)**

Only the SAP background events stored in the SAP event history table are considered by IBM Workload Scheduler to check for internetwork dependencies resolution. As a prerequisite, the SAP administrator must create the appropriate event history profiles and criteria on the target SAP system.

To avoid performance reduction, run reorganization tasks against the SAP event history.



**Note:** Some SAP systems providing XBP version 3.0 still return XBP version as 2.0. To check if your SAP system provides XBP 3.0, invoke the transaction `se37` and search for the function module `BAPI_XBP_BTC_EVTHISTORY_GET`. If your system contains the module, set the `xbpversion` option to 3. In this way, **r3batch** will ignore the XBP value returned by the SAP system. For details about the `xbpversion` option, refer to [Table 31: r3batch common configuration options on page 151](#).

To define an SAP background event as an internetwork dependency, use the following parameters:

**Table 41. Parameters to define an SAP internetwork dependency**

| Parameter                     | Description   | GUI support |
|-------------------------------|---|-------------|
| -evtid <i>sap_event_name</i>  | The name of the SAP background event, up to 32 characters. If the name contains blanks, enclose it between single quotes. This parameter is required.   | ✓           |
| -evtpar <i>sap_event_parm</i> | The SAP event parameter, up to 64 characters. If the parameter contains blanks, enclose it between single quotes. This parameter is optional.   | ✓           |
| -commit                       | Defines that the SAP background event is committed immediately after the internetwork dependency has been resolved. If you do not specify <code>-commit</code> , the event must be committed by running the <code>r3batch</code> task PI. The default is that <code>-commit</code> is not specified. For details about the PI task, refer to <a href="#">Committing SAP background events by an external task on page 258</a> .<br><br>In addition to this parameter, you can set as default that the system commits internetwork dependencies immediately by specifying <code>commit_dependency=on</code> in | ✓           |



**Table 41. Parameters to define an SAP internetwork dependency (continued)**

| Parameter | Description | GUI support |
|-----------|-------------|-------------|
|-----------|-------------|-------------|

the options file. For details about the `commit_dependency` option, see [Table 31: r3batch common configuration options on page 151](#).



**Note:** With XBP version 2.0, defining two internetwork dependencies on the same SAP event might lead to an error, if `-commit` is specified. For example, suppose you define an internetwork dependency for the SAP event `SAPEVT`, with or without setting `-commit`. After this definition, the SAP event `SAPEVT` is raised. Then you define a second internetwork dependency based on `SAPEVT`, specifying `-commit`. The second dependency immediately commits the SAP event, with the consequence that the first dependency becomes impossible to resolve. Therefore, when the first job checks for the internetwork dependency, an error is issued.

The following example shows how to define an internetwork dependency based on the SAP background event named `SAP_TEST` with the parameter `12345678`. After its processing, the event is not immediately committed.

```
-evtid SAP_TEST -evtpar 12345678
```

The resulting internetwork dependency looks like the following, where `SAPWS` is the name of the extended agent workstation that connects to the SAP background processing system where the event runs:

```
follows SAPWS::-evtid SAP_TEST -evtpar 12345678"
```

The following example shows how to define an internetwork dependency based on the SAP background event named `SAP_TEST`, without parameter. As soon as the internetwork dependency is resolved, the event is committed.

```
-evtid SAP_TEST -commit
```

The resulting internetwork dependency looks like the following, where `SAPWS` is the name of the extended agent workstation that connects to the SAP background processing system where the event runs:

```
follows SAPWS::-evtid SAP_TEST -evtpar 12345678"
```

[Table 42: Internetwork dependency definition and possible resolution on page 257](#) shows the correspondence between the definition and possible resolution of an internetwork dependency that depends on an SAP event, with or without parameters assigned. In this table, `SAP_TEST` is used as the event name and `12345678` or `ABCDEFGH` as the event parameter.

**Table 42. Internetwork dependency definition and possible resolution**

| IBM Workload Scheduler<br>internetwork dependency specified | SAP event raised<br>in SAP system | SAP event pa<br>rameter | IBM Workload Scheduler<br>internetwork<br>dependency resolved |
|---|-----------------------------------|-------------------------|---|
| -evtid SAP_TEST   | none                              | none                    | No  |

**Table 42. Internetwork dependency definition and possible resolution (continued)**

| IBM Workload Scheduler<br>internetwork dependency specified | SAP event raised<br>in SAP system | SAP event pa<br>rameter | IBM Workload Scheduler<br>internetwork<br>dependency resolved |
|---|-----------------------------------|-------------------------|---|
| -evtid SAP_TEST   | END_OF_JOB                        | none                    | No  |
| -evtid SAP_TEST   | SAP_TEST                          | none                    | Yes   |
| -evtid SAP_TEST   | SAP_TEST                          | 12345678                | Yes   |
| -evtid SAP_TEST -evtpar 12345678                            | SAP_TEST                          | none                    | No  |
| -evtid SAP_TEST -evtpar 12345678                            | SAP_TEST                          | 12345678                | Yes   |
| -evtid SAP_TEST -evtpar 12345678                            | SAP_TEST                          | ABCDEFGF                | No  |

## Committing SAP background events by an external task

### About this task

SAP events defined as IBM Workload Scheduler internetwork dependencies, by default are not automatically committed after their processing. You can modify this default by specifying the `-commit` parameter. Otherwise, if you leave the default, you must commit the processed event by using the external task Put Information (PI).

The PI task commits all the processed events that meet the given criteria. For this reason, it is recommended that you run this task at the end of the working day. By doing so, internetwork dependencies that are already resolved are not reset and the objects depending on them are not blocked until they are resolved again.

From a command line, enter the following command:

### Command syntax

```
-r3batch -t PI -c XA_Unique_ID -- " -t CE -evtidsap_event_name [ -evtparsap_event_parm ] "
```

Where:

#### **-t PI**

The identifier of the task to be performed, in this case PI (Put Information). This parameter is required.

#### **-c XA\_Unique\_ID**

The unique identifier for the extended agent workstation connected to the SAP background processing system where the event is run. This parameter is required. For information about retrieving the unique identifier for the extended agent workstation, see [UNIQUE\\_ID on page 49](#).

#### **-t CE**

The identifier of the task to be performed, in this case CE (Commit Event). This parameter is required.

**-evtid *sap\_event\_name***

The name of the SAP event running on the background processing system. If the name contains blanks, enclose it between single quotes. This parameter is required.

**-evtpar *sap\_event\_parm***

The parameter of the SAP event running on the background processing system. If the parameter contains blanks, enclose it between single quotes. This parameter is optional. If you do not specify it, all the SAP events with the name you specified, with or without a parameter, are committed on the target system.

The following is an example of how to commit the SAP event named `SAP_TEST`, with parameter `1234567`, with extended agent workstation with unique identifier `horse10` connected to the background processing system:

```
r3batch -t PI -c horse10 -- " -t CE -evtid SAP_TEST -evtpar 1234567"
```

## Defining internetwork dependencies based on SAP background events with the Dynamic Workload Console

### About this task

To define an SAP background event as an internetwork dependency with the Dynamic Workload Console, perform the following steps:

1. Launch Workload Designer from the Dynamic Workload Console portfolio. Click **Design > Manage Workload Definitions**.
2. Search for and open the job stream you want to manage.
  - a. In the **Working List** pane, click **Search > Job Stream**.
  - b. Type the job stream name or simply click **Search** to display all job streams.
  - c. Select the job stream and click **Edit**. The job stream and its contents are displayed in the **Details** view.
3. Type the job stream name or simply click **Search** to display all job streams.
4. From the **Details** view, select the job or the job stream to which you want to add the dependency.
5. From the toolbar, click **Select an Action > Add Dependencies > Internetwork**.
6. Specify the properties for the internetwork dependency.
  - a. In the **Network Agent** field, enter the name of the agent workstation connected to the SAP background processing system where the event runs.
  - b. In the **Dependency** field, enter the parameters to define the internetwork dependency. For a description of the parameters allowed, refer to [Table 41: Parameters to define an SAP internetwork dependency on page 256](#).
7. Click **Save** to save the changes to the job stream.

### Results

The local job or job stream now has a dependency on a SAP background event. You can also perform this procedure from the graphical view available from the **Workload Designer**. For more information about adding dependencies and editing objects in the Graphical View, refer to the Dynamic Workload Console User's Guide.

## Defining event rules based on SAP background events

A scheduling event rule defines a set of actions to run when specific event conditions occur. The definition of an event rule correlates events and triggers actions.

An event rule is identified by a rule name and by a set of attributes that specify if the rule is active, the time frame of its validity, and other information required to decide when actions are triggered. It includes information related to the specific events (`eventCondition`) that the rule must detect and the specific actions it is to trigger upon their detection or timeout (`ruleAction`). Complex rules might include multiple events and multiple actions.

If you are using XBP 3.0, only the SAP background events that are stored in the event history table are considered by IBM Workload Scheduler.

To define event rules, you can use either of the following:

### The composer command line

You edit the rules with an XML editor of your choice. For details about how to use the composer to define event rules, see the *IBM Workload Scheduler User's Guide and Reference*.

### The Dynamic Workload Console

For information about creating an event rule, see the section about creating an event rule in *Dynamic Workload Console User's Guide*.

For more details about the properties used to define the SAP event rule, see the following table available only in html format in the online information center: [SAP Event Raised](#).

The SAP background event is identified by the following information:

### SAP Event ID

The name identifying the SAP event. Wildcards are not allowed.

If you are using the Dynamic Workload Console, you can type the event name in the SAP Event ID field. This field does not support wildcard characters (\* and %), nor the following special characters: asterisk (\*), question mark (?), and backslash (\). Note that for supported special characters, the escape character (\) must not be used.

Alternatively, you can use the lookup function to search for and select the event name. When specifying the string to search for that represents the SAP Event ID, wildcard characters are supported, (\* and %). For example, if you specify "myevent\*", then results can include events such as "myevent", "myevent%", and "myevents".

### Event parameter

The parameter associated with the SAP event, if any. Wildcards are not allowed.

If you are using the Dynamic Workload Console, the following special characters are not supported when specifying the event parameter: asterisk (\*), question mark (?), and backslash (\).

### Extended or dynamic agent workstation

The name of the extended agent workstation or the name of the dynamic agent workstation running event monitoring.



#### Note:

1. If you specify a pattern with the wildcard asterisk (\*), all the agents whose name matches the pattern will monitor the specified event.
2. As a best practice, define that an event belonging to an SAP system is monitored by one agent workstation only. If the same SAP event is monitored by more than one agent, you might either be notified multiple times for the same event occurrence or the first agent that notifies the event occurrence makes that event unavailable to the other agents.
3. If you modify the extended agent configuration in the `r3batch` option files, to make the changes effective you must stop and restart the agent.
4. For dynamic agents you can specify the name of a local options file. In the Properties section of the Create Event Rules window of the Dynamic Workload Console a lookup button provides a list of all the local options files associated with that agent. If you do not specify the name of a local options file, the global options file is used by default in the rule definition.

## SAP events matching criteria

The SAP background events specified in the event rule are matched with the events raised in the SAP system, according to the following criteria. Depending on the parameters you set:

### The SAP event ID and parameter are specified in the event rule

To match, the SAP event ID and parameter must be the same as the event ID and event parameter raised in the SAP system. Also, the event state must be N (New). SAP events with a different parameter or without any parameter are ignored.

The information collected about the matching SAP event is sent by the `r3evmon` process to IBM Workload Scheduler. If the notification is successfully sent, the event is committed on the SAP system and its state changed to C (Confirmed).

For example, you define an event rule in your IBM Workload Scheduler plan based on the following SAP event:

#### SAP event ID

SAP\_TEST

#### SAP event parameter

ABCDEF

#### Workstation

An extended agent named GENIUS

According to these settings, a file named `GENIUS_r3evmon.cfg` is created on `GENIUS`. It contains the following `R3EVENT` keyword:

```
!R3EVENT 0008SAP_TEST0006ABCDEF
```

Monitoring of the `SAP_TEST` event with parameter `ABCDEF` is automatically started. Suppose that the following SAP events were raised on the SAP system:

**Table 43. History table of the SAP events raised**

| EVENT GUID | SAP EV ENT ID | EVENT PARM | EVENT SERVER | EVENT TIM ESTAMP | EVENT STATE | PROCESS STATE | COUNT OF JOBS |
|------------|---------------|------------|--------------|------------------|-------------|---------------|---------------|
| 1234       | SAP_TEST      | ABC123     | ...          | 20070925 13:00   | C           | OK            | 1             |
| 2345       | SAP_TEST      | ABCD       | ...          | 20070925 14:00   | N           | OK            | 2             |
| 3456       | SAP_TEST      |            | ...          | 20070925 15:00   | N           | OK            | 3             |
| 4567       | SAP_TEST      | ABCDEF     | ...          | 20070925 16:00   | N           | OK            | 4             |

Only the following SAP event is notified to IBM Workload Scheduler:

**Table 44. SAP event matching with the event rule defined**

| EVENT GUID | SAP EV ENT ID | EVENT PARM | EVENT SERVER | EVENT TIM ESTAMP | EVENT STATE | PROCESS STATE | COUNT OF JOBS |
|------------|---------------|------------|--------------|------------------|-------------|---------------|---------------|
| 4567       | SAP_TEST      | ABCDEF     | ...          | 20070925 16:00   | N           | OK            | 4             |

If the notification is successfully sent, the event is committed on the SAP system and its state changed to C (Confirmed).

**Only the SAP event ID is specified in the event rule**

To match, the SAP event ID must be the same as the ID of the events raised in the SAP system whose state is N (New). The parameters of the SAP events, whether specified or not, are not taken into account.

The information collected about all the matching SAP events is sent by the `r3evmon` process to IBM Workload Scheduler. Each event successfully notified is committed on the SAP system and its status changed to C (Confirmed).

For example, you define an event rule in your IBM Workload Scheduler plan based on the following SAP event:

**SAP event ID**

```
SAP_TEST
```

**Workstation**

```
GENIUS
```

According to these settings, a file named `GENIUS_r3evmon.cfg` is created on `GENIUS`. It contains the following `R3EVENT` keyword:

```
!R3EVENT 0008SAP_TEST
```

Monitoring of the `SAP_TEST` event is automatically started. Suppose that the following SAP events were raised on the SAP system:

**Table 45. History table of the SAP events raised**

| EVENT GUID | SAP EV ENT ID | EVENT PARM | EVENT SERVER | EVENT TIM ESTAMP | EVENT STATE | PROCESS STATE | COUNT OF JOBS |
|------------|---------------|------------|--------------|------------------|-------------|---------------|---------------|
| 1234       | SAP_TEST      | ABC123     | ...          | 20070925 13:00   | C           | OK            | 1             |
| 2345       | SAP_TEST      | ABCD       | ...          | 20070925 14:00   | N           | OK            | 2             |
| 3456       | SAP_TEST      |            | ...          | 20070925 15:00   | N           | OK            | 3             |
| 4567       | SAP_TEST      | ABCDEF     | ...          | 20070925 16:00   | N           | OK            | 4             |

Only the following SAP events are notified to IBM Workload Scheduler:

**Table 46. SAP events matching with the event rule defined**

| EVENT GUID | SAP EV ENT ID | EVENT PARM | EVENT SERVER | EVENT TIM ESTAMP | EVENT STATE | PROCESS STATE | COUNT OF JOBS |
|------------|---------------|------------|--------------|------------------|-------------|---------------|---------------|
| 2345       | SAP_TEST      | ABCD       | ...          | 20070925 14:00   | N           | OK            | 2             |
| 3456       | SAP_TEST      |            | ...          | 20070925 15:00   | N           | OK            | 3             |
| 4567       | SAP_TEST      | ABCDEF     | ...          | 20070925 16:00   | N           | OK            | 4             |

Each event whose notification is successfully sent is committed on the SAP system and its state changed to C (Confirmed).

## Setting a filter for SAP background events in the security file

In the security file, you can filter the SAP background events that can be used to define event rules. By doing this, you restrict the use of certain SAP events to specific users. For example, assume that you want your USA department to manage only the SAP events whose ID begins with `SAP_USA`, and your Italy department to manage all events except those beginning with `SAP_USA`. In the security file that defines the user access for the USA department, define the `CUSTOM` keyword for the `EVENT` object as follows:

```
EVENT PROVIDER=@ +CUSTOM=SAP_USA@ ACCESS=USE
```

where:

**PROVIDER=@**

Specifies that the user can use the events coming from any provider.

**+CUSTOM=SAP\_USA@**

Specifies that the user can use only the SAP events whose ID begins with `SAP_USA`.

This keyword applies only to the SAP provider (SapMonitor).

`ACCESS=USE`

Sets the user access to the object to `USE`.

In the security file that defines the user access for the Italy department, define the `CUSTOM` keyword for the `EVENT` object as follows:

```
EVENT PROVIDER=@ ~CUSTOM=SAP_USA@ ACCESS=USE
```

where:

`PROVIDER=@`

Specifies that the user can use the events coming from any provider.

`~CUSTOM=SAP_USA@`

Specifies that the user can use all SAP events, except those whose ID begins with `SAP_USA`.

This keyword applies only to the SAP provider (SapMonitor).

`ACCESS=USE`

Sets the user access to the object to `USE`.

For more details about the security file and how to set up user authorizations, see the *IBM Workload Scheduler: Administration Guide*.

## Defining event rules based on IDoc records

You can use IBM Workload Scheduler to monitor Intermediate Document (IDoc) records in SAP systems and forward events to the IBM Workload Scheduler event integration framework.

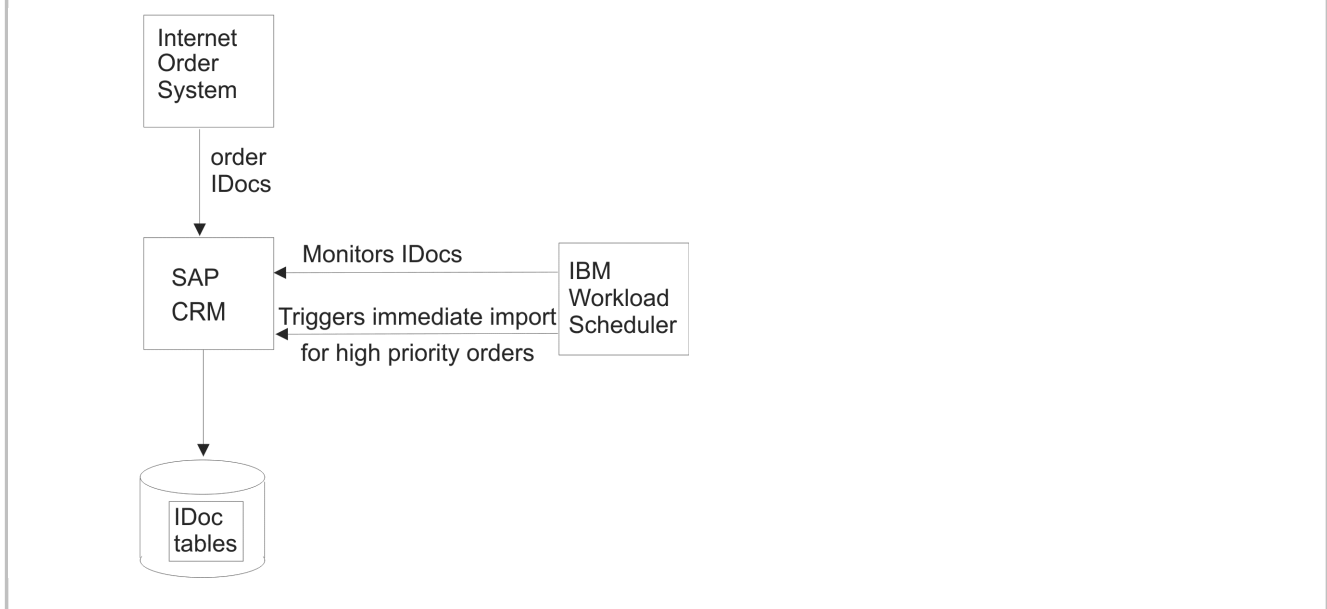
To do this, you define an event condition that contains the criteria that the IDocs must match to be forwarded to IBM Workload Scheduler. When the event condition occurs, the action that you associated with it (for example, running a job) is performed.

## Business scenario

You connected your Internet sales application to your SAP Customer Relationship Management (CRM) system, which receives the orders as incoming IDocs. The orders are classified as emergency and ordinary, and therefore have different IDoc message types. You want the emergency orders to be imported into the CRM system directly, and the ordinary orders to be processed in batch mode. To do this, in IBM Workload Scheduler, you define an event rule that monitors the IDoc message types corresponding to emergency orders and sends an event to IBM Workload Scheduler. In IBM Workload Scheduler, you define a job to be released when this type of event is received and is linked to an SAP job that runs an import ABAP report for these specific types of IDocs.



Figure 17. Managing high priority IDocs overview



## Creating event rules based on IDocs

### About this task

To define event rules based on IDocs, specify the fields to be used as matching criteria during IDoc monitoring. For details about these fields, refer to [Events matching criteria on page 266](#). To create the event rules, you can use either of the following:

#### The composer command line

You edit the rules with an XML editor of your choice. For a general explanation about how to use the composer to define event rules, see the *IBM Workload Scheduler: User's Guide and Reference*. The event condition requires:

- `SAPMonitor` as event monitor provider.
- `IDOCEventGenerated` as event type.

For a list of the values that you can specify in the **attributeFilter** name when defining the event condition, refer to [Table 49: Parameters of IDOCEventGenerated event type on page 268](#).

#### The Dynamic Workload Console

For information about creating an event rule, see the section about creating an event rule in *Dynamic Workload Console User's Guide*.

For more details about the properties used to define the IDoc event rule, see the following table available only in html format in the online information center: [Event Raised](#).



**Note:**



1. To be able to define and monitor event rules, ensure that you configured your environment as described in [Configuring SAP event monitoring on page 165](#).
2. To configure how IBM Workload Scheduler retrieves the IDoc monitors, set **idoc\_no\_history** and **idoc\_shallow\_result** in the options file. For details about these options, refer to [Defining the common options on page 150](#).

## Events matching criteria

[Table 47: IBM Workload Scheduler fields used to define event rules based on IDocs on page 266](#) lists the IBM Workload Scheduler fields corresponding to the fields in the IDoc record that you want to search. During monitoring, each IDoc matching the search criteria generates an event that is sent to IBM Workload Scheduler.

**Table 47. IBM Workload Scheduler fields used to define event rules based on IDocs**

| Composer property            | Console property          | IDoc field |
|------------------------------|---------------------------|------------|
| SAPClient                    | SAP client                | MANDT      |
| SAPIDocStatus                | Status                    | STATUS     |
| SAPDirectionIDocTransmission | Direction                 | DIRECT     |
| SAPReceiverPort              | Receiver port             | RCVPOR     |
| SAPReceiverPartnerFunction   | Receiver partner function | RCVPFC     |
| SAPReceiverPartnerType       | Receiver partner type     | RCVPRT     |
| SAPReceiverPartnerNumber     | Receiver partner number   | RCVPRN     |
| SAPSenderPort                | Sender port               | SNDPOR     |
| SAPSenderPartnerType         | Sender partner type       | SNDPRT     |
| SAPSenderPartnerFunction     | Sender partner function   | SNDPFC     |
| SAPSenderPartnerNumber       | Sender partner number     | SNDPRN     |
| SAPLogicalMessageType        | Logical message type      | MESTYP     |
| SAPNameOfBasicType           | Name of basic type        | IDOCTP     |
| SAPLogicalMessageCode        | Logical message code      | MESCOD     |
| SAPLogicalMessageFunction    | Logical message function  | MESFCT     |
| SAPTestFlag                  | Test flag                 | TEST       |
| SAPOutputMode                | Output mode               | OUTMOD     |

Optionally, you can define also correlation rules by using the fields listed in [Table 48: IBM Workload Scheduler fields used to define correlation rules for IDoc events on page 267](#). Date and time values are specified in GMT time zone.

**Table 48. IBM Workload Scheduler fields used to define correlation rules for IDoc events**

| Composer property                      | Console property                 | IDoc field |
|--|----------------------------------|------------|
| SAPIDocNumber                          | IDoc number                      | DOCNUM     |
| SAPReleaseForIDoc                      | IDoc SAP release                 | DOCREL     |
| SAPIDocType                            | IDoc type                        | DOCTYP     |
| SAPReceiverAddress                     | Receiver SADR address            | RCVSAD     |
| SAPReceiverSADRClient                  | Receiver SADR client             | RCVSMN     |
| SAPFlagForInternationalReceiverAddress | Receiver SADR flag               | RCVSNA     |
| SAPReceiverCommunicationType           | Receiver SADR communication type | RCVSCA     |
| SAPDefaultFlagForReceiverAddress       | Receiver SADR default flag       | RCVSDF     |
| SAPReceiverAddressSequentialNumber     | Receiver SADR sequential number  | RCVSLF     |
| SAPReceiverLogicalAddress              | Receiver logical address         | RCVLAD     |
| SAPEDIStandard                         | EDI Standard                     | STD        |
| SAPEDIStandardVersion                  | EDI standard version             | STDVRS     |
| SAPEDIMessageType                      | EDI message type                 | STDMES     |
| SAPSenderAddress                       | Sender SADR address              | SNDSAD     |
| SAPSenderSADRClient                    | Sender SADR client               | SNDSMN     |
| SAPFlagForInternationalSenderAddress   | Sender SADR flag                 | SNDSNA     |
| SAPSenderCommunicationType             | Sender SADR communication type   | SNDSKA     |
| SAPDefaultFlagForSenderAddress         | Sender SADR default flag         | SNDSDF     |
| SAPSenderAddressSequentialNumber       | Sender SADR sequential number    | SNDSLK     |
| SAPSenderLogicalAddress                | Sender logical address           | SNDLAD     |
| SAPReferenceToInterchangeFile          | Interchange file reference       | REFINT     |
| SAPReferenceToMessageGroup             | Message group reference          | REFGRP     |
| SAPReferenceToMessage                  | Message reference                | REFMES     |
| SAPEDIArchiveKey                       | EDI archive key                  | ARCKEY     |
| SAPIDocCreationDate                    | IDoc creation date               | CREDAT     |
| SAPIDocCreationTime                    | IDoc creation time               | CRETIM     |
| SAPExtension                           | Extension                        | CIMTYP     |
| SAPEDIALESerializationField            | EDI/ALE Serialization field      | SERIAL     |
| SAPOverridingInInboundProcessing       | Overriding in inbound processing | EXPRSS     |

**Table 48. IBM Workload Scheduler fields used to define correlation rules for IDoc events (continued)**

| Composer property | Console property      | IDoc field |
|-------------------|-----------------------|------------|
| SAPIDocChangeDate | IDoc last update date | UPDDAT     |
| SAPIDocChangeTime | IDoc last update time | UPDTIM     |

Based on the defined rule, the `r3evmon` process of IBM Workload Scheduler monitors the events related to IDoc records according to a polling rate. To customize this polling rate, use the `evmon_interval` option; for details, see [Defining the common options on page 150](#).

[Table 49: Parameters of IDOCEventGenerated event type on page 268](#) lists the values that you can specify as attribute filter name when defining the event condition.

**Table 49. Parameters of IDOCEventGenerated event type**

| Property name                | Description   | Type                                      | Filtering allowed | Required | Multiple values allowed | Wildcard allowed | Length (min-max) |
|------------------------------|---|---|-------------------|----------|-------------------------|------------------|------------------|
| SAPClient                    | SAP client number   | numeric (0-9)                             | ✓                 | ✓        |                         | ✓                | 1 3              |
|                              | IDoc status information   |   |                   |          |                         |                  |                  |
|                              | For a list of allowed values, refer to <a href="#">Table 50: Standard outbound IDoc statuses on page 270</a> and <a href="#">Table 51: Standard inbound IDoc statuses on page 271</a> . |   |                   |          |                         |                  |                  |
| SAPIDocStatus                |   | numeric                                   | ✓                 | ✓        | ✓                       |                  | 1 2              |
|                              |   | numeric                                   |                   |          |                         |                  |                  |
| SAPDirectionIDocTransmission | IDoc direction  | Value can be 1 (outbound) or 2 (inbound). | ✓                 | ✓        |                         |                  | 1 1              |
| SAPReceiverPort              | Receiver port. SAP system, EDI subsystem  | string                                    | ✓                 |          |                         |                  | 1 10             |
| SAPReceiverPartnerFunction   | Partner function of receiver  | string                                    | ✓                 |          |                         |                  | 1 2              |
| SAPReceiverPartnerType       | Partner type of receiver  | string                                    | ✓                 |          |                         |                  | 1 2              |
| SAPReceiverPartnerNumber     | Partner number of receiver  | string                                    | ✓                 |          |                         |                  | 1 10             |
| SAPSenderPort                | Sender port. SAP system, EDI subsystem  | string                                    | ✓                 |          |                         |                  | 1 10             |
| SAPSenderPartnerType         | Partner type of sender  | string                                    | ✓                 |          |                         |                  | 1 2              |

Table 49. Parameters of IDOCEventGenerated event type

(continued)

| Property name             | Description                | Type  | Filtering allowed | Required | Multiple values allowed | Wildcard allowed | Length (min-max) |
|---------------------------|----------------------------|---|-------------------|----------|-------------------------|------------------|------------------|
| SAPSenderPartnerFunction  | Partner function of sender | string  | ✓                 |          |                         |                  | 1 2              |
| SAPSenderPartnerNumber    | Partner number of sender   | string  | ✓                 |          |                         |                  | 1 10             |
| SAPLogicalMessageType     | Logical message type       | string  | ✓                 |          |                         | ✓                | 1 30             |
| SAPNameOfBasicType        | Name of basic type         | string  | ✓                 |          |                         | ✓                | 1 30             |
| SAPLogicalMessageCode     | Logical message code       | string  | ✓                 |          |                         |                  | 1 3              |
| SAPLogicalMessageFunction | Logical message function   | string  | ✓                 |          |                         |                  | 1 3              |
| SAPTestFlag               | Test flag                  | string  | ✓                 |          |                         |                  | 1 1              |
|                           |                            | string  |                   |          |                         |                  |                  |
|                           |                            | Value can be 2                                |                   |          |                         |                  |                  |
| SAPOutputMode             | Output Mode                | (immediate sending) or 4 (collected sending). | ✓                 |          |                         |                  | 1 1              |

[Table 50: Standard outbound IDoc statuses on page 270](#) lists the standard outbound IDoc statuses and [Table 51: Standard inbound IDoc statuses on page 271](#) lists the standard inbound IDoc statuses. Optionally, you can activate a check to prevent event rule definitions with inconsistent IDoc status list and direction. If you activate the check and specify inconsistent values when defining a rule (for example, 02 as status and 2 as direction), you receive an error message and you cannot save the rule definition. To activate the check, perform the following steps:

1. In the `TWA_home>\eventPlugIn` directory on Windows™ and in the `TWA_DATA_DIR/eventPlugIndirectory` on UNIX®, create the `SapMonitorPlugIn.properties` file.
2. Edit `SapMonitorPlugIn.properties` to set the following configuration property:

```
TWSPlugIn.event.idoc.consistency.check = true
```
3. From `conman`, stop and restart the event processing server by using, respectively, the `stopeventprocessor` and `starteventprocessor` commands.

The default value is `false`.

To have predictable event action results, when defining event rules consider using only non-transitory statuses that allow user checks.

**Table 50. Standard outbound IDoc statuses**

| Status | Description                                       |
|--------|---|
| 01     | IDoc generated                                    |
| 02     | Error passing data to port                        |
| 03     | Data passed to port                               |
| 04     | Error within control information of EDI subsystem |
| 05     | Error during translation                          |
| 06     | Translation                                       |
| 07     | Error during syntax check                         |
| 08     | Syntax check                                      |
| 09     | Error during interchange                          |
| 10     | Interchange handling                              |
| 11     | Error during dispatch                             |
| 12     | Dispatch OK                                       |
| 13     | Retransmission OK                                 |
| 14     | Interchange acknowledgement positive              |
| 15     | Interchange acknowledgement negative              |
| 16     | Functional acknowledgement positive               |
| 17     | Functional acknowledgement negative               |
| 18     | Triggering EDI subsystem OK                       |
| 19     | Data transfer for test OK                         |
| 20     | Error triggering EDI subsystem                    |
| 22     | Dispatch OK, acknowledgement still due            |
| 23     | Error during retransmission                       |
| 24     | Control information of EDI subsystem OK           |
| 25     | Processing despite syntax error                   |
| 26     | Error during syntax check of IDoc                 |
| 27     | Error in dispatch level (ALE service)             |
| 29     | Error in ALE service                              |
| 30     | IDoc ready for dispatch (ALE service)             |
| 31     | Error no further processing                       |

**Table 50. Standard outbound IDoc statuses (continued)**

| Status | Description                                       |
|--------|---|
| 32     | IDoc was edited                                   |
| 33     | Original of an IDoc which was edited              |
| 34     | Error in control record of IDoc                   |
| 36     | Electronic signature not performed (timeout)      |
| 37     | IDoc added incorrectly                            |
| 38     | IDoc archived                                     |
| 39     | IDoc is in the target system (ALE service)        |
| 40     | Application document not created in target system |
| 41     | Application document created in target system     |
| 42     | IDoc was created by test transaction              |

**Table 51. Standard inbound IDoc statuses**

| Status | Description  |
|--------|--|
| 50     | IDoc added   |
| 51     | Application document not posted                      |
| 52     | Application document not fully posted                |
| 53     | Application document posted                          |
| 54     | Error during formal application check                |
| 55     | Formal application check OK                          |
| 56     | IDoc with errors added                               |
| 57     | Error during application check                       |
| 58     | IDoc copy from R/2 connection                        |
| 60     | Error during syntax check of IDoc                    |
| 61     | Processing despite syntax error                      |
| 62     | IDoc passed to application                           |
| 63     | Error passing IDoc to application                    |
| 64     | IDoc ready to be transferred to application          |
| 65     | Error in ALE service                                 |
| 66     | IDoc is waiting for predecessor IDoc (serialization) |





```

    <filteringPredicate> <attributeFilter name="Workstation" operator="eq">
      <value>SAPCPU</value>
    </attributeFilter>
    <attributeFilter name="SAPClient" operator="eq">
      <value>001</value>
    </attributeFilter>
    <attributeFilter name="SAPIDocStatus" operator="eq">
      <value>50</value>
    </attributeFilter>
    <attributeFilter name="SAPDirectionIDocTransmission" operator="eq">
      <value>2</value>
    </attributeFilter>
    <attributeFilter name="SAPLogicalMessageType" operator="eq">
      <value>EORD1</value>
    </attributeFilter>
  </filteringPredicate>
</eventCondition>
<action actionProvider="TWSaction" actionType="sbj"
  responseType="onDetection">
  <description>Trigger immediate report for high priority orders
</description>
  <parameter name="JobDefinitionWorkstationName">
    <value>MASTER84</value>
  </parameter>
  <parameter name="JobDefinitionName">
    <value>triggerimport</value>
  </parameter>
</action>
</eventRule>
</eventRuleSet>

```

The following example shows an event rule defined to create a ticket for failing IDocs in the SAP Solution Manager or any other problem management system: when an IDoc with a syntax error is detected, the engine submits a job to create a ticket for the failing IDoc.

```

<?xml version="1.0" encoding="UTF-8"?>
<eventRuleSet xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns="http://www.abc.com/xmlns/prod/tws/1.0/event-management/rules"
  xsi:schemaLocation="http://www.abc.com/xmlns/prod/tws/1.0/
  event-management/rules EventRules.xsd">
  <eventRule name="scenario1_IDoc" ruleType="filter" isDraft="no">
    <eventCondition name="IDocEventRaised1" eventProvider="SapMonitor"
      eventType="IDocEventGenerated">
      <filteringPredicate> attributeFilter name="Workstation" operator="eq">
        <value>SAPCPU</value>
      </attributeFilter>
      <attributeFilter name="SAPClient" operator="eq">
        <value>001</value>
      </attributeFilter>
      <attributeFilter name="SAPIDocStatus" operator="eq">
        <value>60</value>
      <attributeFilter name="SAPDirectionIDocTransmission" operator="eq">
        <value>2</value>
      </attributeFilter>
      </attributeFilter>
      <attributeFilter name="SAPLogicalMessageType" operator="eq">
        <value>MYORD1</value>
      </attributeFilter>
    </eventCondition>
  </eventRule>
</eventRuleSet>

```

```

    </filteringPredicate>
  </eventCondition>
  <action actionProvider="TWSaction" actionType="sbj"
    responseType="onDetection">
    <description>Create a ticket for failing IDocs
    </description>
    <parameter name="JobDefinitionWorkstationName">
      <value>MASTER84</value>
    </parameter>
    <parameter name="JobDefinitionName">
      <value>createticket</value>
    </parameter>
  </action>
</eventRule></eventRuleSet>

```

## Defining event rules based on CCMS Monitoring Architecture alerts

Use CCMS functions to check the performance of the various SAP system components, diagnose potential problems, and be alerted about error and warning conditions.

The SAP Computing Center Monitoring System (CCMS) is a centralized monitoring architecture that provides a set of monitors for monitoring the SAP environment. Using the CCMS functions you can check the performance of the various SAP system components, diagnose potential problems, and be alerted about error and warning conditions. The monitors provide you with the information you require to fine tune the SAP system and the operating modes, and hence optimize system performance.

With IBM Workload Scheduler, you can integrate the CCMS monitoring functions into your management infrastructure by defining event rules based on the alerts raised in the SAP system.

## Business scenarios

The following sections describe:

- [Business scenario: defining an event rule to process alerts related to IDocs on page 274](#)
- [Business scenario: defining an event rule to process alerts related to operating system on page 275](#)

### Business scenario: defining an event rule to process alerts related to IDocs

You connected your Internet sales application to your SAP Customer Relationship Management (CRM) system, which receives the orders as incoming IDocs. You want to import the orders into the CRM system when their number exceeds a specified threshold, therefore you configured your SAP CCMS monitoring architecture to generate an alert when the number of incoming IDocs exceeds a certain value. To automatically start a task that imports the orders:

1. In your SAP CCMS monitoring architecture, identify the element related to the alert that you configured for the incoming order IDocs.
2. In IBM Workload Scheduler, define an event rule, to be active during the timeframe when inbound order traffic is heavy, which monitors the element identified in step 1. As soon as an alert is generated for the element, a CCMS event is sent to IBM Workload Scheduler.
3. In IBM Workload Scheduler, define a job to be submitted when the CCMS event is received, to run an SAP job that runs an import ABAP report for the order IDocs.

## Business scenario: defining an event rule to process alerts related to operating system

As an IBM Workload Scheduler administrator, you are in charge of taking the appropriate action in the IBM Workload Scheduler plan when a critical situation occurs in the SAP system. You have an SAP extended agent workstation dedicated to submit Business Intelligence tasks, whose activity you want to suspend every time the SAP BI system faces a critical situation (for example, the SAP system is running out of space). To do this:

1. In your SAP CCMS monitoring architecture, identify the element related to the SAP system you want to monitor.
2. In IBM Workload Scheduler, define an event rule that monitors the element and sends an event to IBM Workload Scheduler when an alert is generated for it. Associate with this event an action that sets the limit of the agent workstation to 0, and sends a mail to the SAP administrator to notify the details of the critical situation.
3. As soon as the SAP administrator resolves the problem, you set the limit of the agent workstation back to its original value to resume the scheduling activities.

## Creating event rules based on CCMS alerts

### About this task

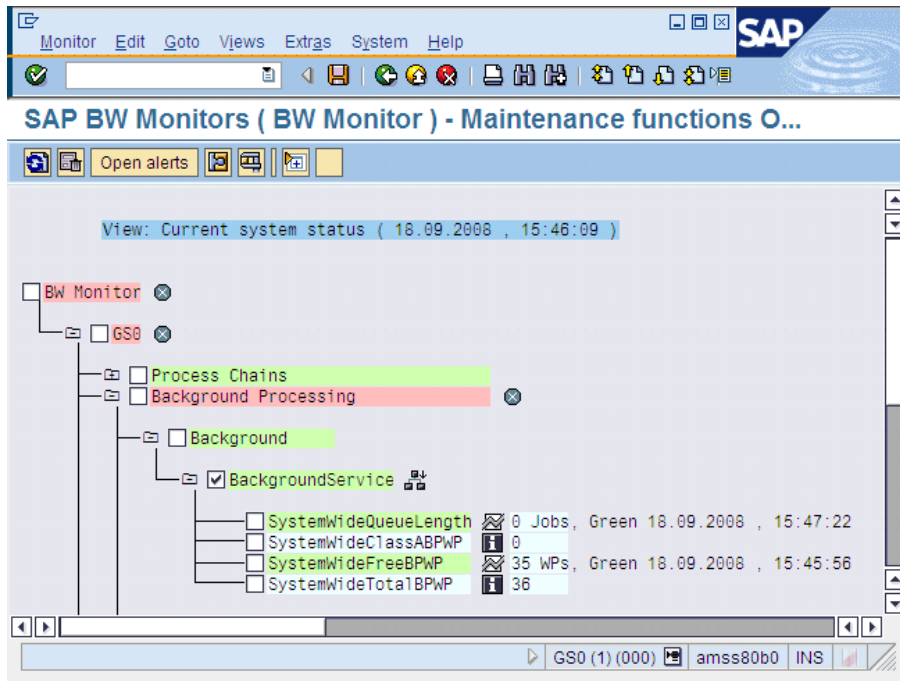
SAP systems are shipped with a predefined set of monitors, grouped in *monitor sets*. A monitor set contains a list of monitors, each monitor contains a set of *monitoring trees*. A monitor is a set of *monitoring tree elements* (MTEs) that are arranged in a hierarchical structure, named *alert monitoring tree*. You can define event rules based on the alert generated for a specific MTE.



**Note:** To be able to define and monitor event rules, ensure that you configured your environment as described in [Configuring SAP event monitoring on page 165](#).

Figure 18: A monitor and its MTEs - © SAP AG 2009. All rights reserved. on page 276 shows the monitor named **BW Monitor** (belonging to the monitor set **SAP BW Monitor**) and its associated monitor tree elements (MTEs).

Figure 18. A monitor and its MTEs - © SAP AG 2009. All rights reserved.



To configure how IBM Workload Scheduler retrieves the CCMS alerts, set **ccms\_alert\_history** in the options file. For details about this option, refer to [Defining the common options on page 150](#).

To create event rules, you can use either of the following:

#### The composer command line

You edit the rules with an XML editor of your choice. For a general explanation about how to use the composer to define event rules, see the *User's Guide and Reference*.

#### The Dynamic Workload Console

For information about creating an event rule, see the section about creating an event rule in *Dynamic Workload Console User's Guide*.

For more details about the properties used to define the CCMS event rule, see the following table available only in html format in the online information center: [SAP Event Raised](#).

To define the CCMS event for your rule, specify the following information. For more details about how you separate the MTE name into the individual IBM Workload Scheduler fields, see [Mapping between the MTE name and IBM Workload Scheduler fields on page 278](#).

#### Extended or dynamic agent workstation

The name of the extended agent workstation or the name of the dynamic agent workstation running event monitoring.



**Note:**



1. If you specify a pattern with the wildcard asterisk (\*), all the agents whose name matches the pattern will monitor the specified event.
2. As a best practice, define that an event belonging to an SAP system is monitored by one agent workstation only. If the same SAP event is monitored by more than one agent, you might either be notified multiple times for the same event occurrence or the first agent that notifies the event occurrence makes that event unavailable to the other agents.
3. If you modify the extended agent configuration in the `r3batch` option files, to make the changes effective you must stop and restart the agent.
4. For dynamic agents you can specify the name of a local options file. In the Properties section of the Create Event Rules window of the Dynamic Workload Console a lookup button provides a list of all the local options files associated with that agent. If you do not specify the name of a local options file, the global options file is used by default in the rule definition.

### MTE SAP System ID

Name of the SAP system where the MTE is located (for example, `GS0` in [Figure 18: A monitor and its MTEs - © SAP AG 2009. All rights reserved. on page 276](#)). This field is required. Wildcards are not allowed, you can specify up to eight characters.

### MTE Monitoring Context Name

Name of the monitoring context to which the MTE belongs. This field is required. A monitoring context is a logically connected group of monitoring objects that are ordered together under one summary in the monitoring tree (for example, `Background` in [Figure 18: A monitor and its MTEs - © SAP AG 2009. All rights reserved. on page 276](#)).

Wildcards are not allowed, you can specify up to 40 characters.

### MTE Monitoring Object Name

Name of the monitoring object in the alert monitor. This field is required. A monitoring object is a component or property of the system that is to be monitored (for example, `BackgroundService` in [Figure 18: A monitor and its MTEs - © SAP AG 2009. All rights reserved. on page 276](#)). If you choose not to specify a value, you must leave the value NULL, which is the default.

Wildcards are not allowed, you can specify up to 40 characters.

### MTE Monitoring Attribute Name

Name of the monitoring attribute in the alert monitor. In the monitoring tree, a monitoring attribute is always an end node in the hierarchy (for example, `SystemWideFreeBPWF` in [Figure 18: A monitor and its MTEs - © SAP AG 2009. All rights reserved. on page 276](#)). This field is required. If you choose not to specify a value, you must leave the value NULL, which is the default.

Wildcards are not allowed, you can specify up to 40 characters.

**Alert Value**

Numeric value that indicates the color of the alert generated for the MTE. This field is optional. You can specify one or a combination of the following values:

**1**

Green, meaning Everything OK.

**2**

Yellow, meaning Warning.

**3**

Red, meaning Problem or error.

If you do not specify any value, all the alerts generated for the MTE are considered.

**Alert Severity**

Severity of the alert. It can be a number between 0 (lowest) and 255 (highest), or a range among these values.

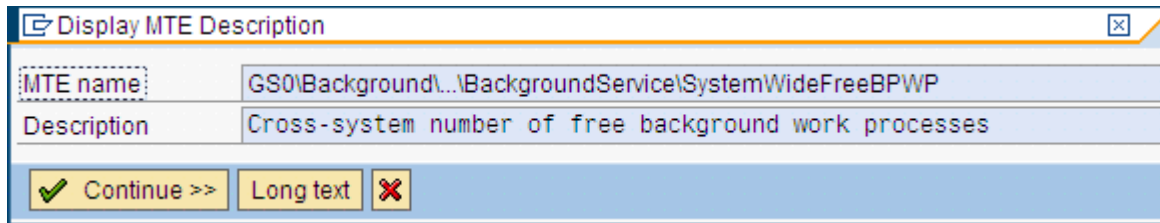
This field is optional. Alert severity is assigned during alert configuration; the SAP standard configuration is 50.

## Mapping between the MTE name and IBM Workload Scheduler fields

**About this task**

Within SAP, MTEs are identified by a name made up of several tokens, separated by backslashes (\). To display the complete MTE name, select the MTE and click **Properties** or press **F1**:

Figure 19. Name and description of an MTE - © SAP AG 2009. All rights reserved.



According to the type of MTE that you want to monitor, you must fill in each IBM Workload Scheduler field with a specific token of the MTE name (to know your MTE type, select the MTE and click **Legend**):

**If you are using Dynamic Workload Console V8.5.1, or later**

1. In the **Event Rule Editor** panel, from the **Properties** section, click **Autofill MTE Tokens**. The **MTE Name** window opens.
2. In the **MTE Name** field, write the name of the MTE to monitor and click **OK**. You are returned to the **Event Rule Editor** panel, where the IBM Workload Scheduler fields are filled in accordingly.

**If you are using Dynamic Workload Console prior to V8.5.1**

Refer to the instructions provided in the following sections:

- [Context MTE on page 279](#)
- [Object MTE on page 280](#)
- [Attribute MTE on page 280](#)



**Note:** Virtual MTEs cannot be monitored.

## Context MTE

A context MTE is the uppermost node of a monitoring tree; it contains all the associated object MTEs and attribute MTEs. Context nodes can be either of the following types:

### Root

Belongs only to the All Monitoring Contexts monitor. According to the SAP version you are using, a root context MTE name can have either of the following formats:

```
tokenA\tokenB\...
- OR -
tokenA\tokenB
```

For example:

```
T10\SystemConfiguration\...
```

Refer to [Table 52: Mapping between root context MTE name and IBM Workload Scheduler fields on page 279](#) for an explanation about how you report this type of MTE in the IBM Workload Scheduler fields:

**Table 52. Mapping between root context MTE name and IBM Workload Scheduler fields**

| IBM Workload Scheduler field  | Token of MTE name | In this example...  |
|-------------------------------|-------------------|---------------------|
| MTE SAP System ID             | <i>tokenA</i>     | T10                 |
| MTE Monitoring Context Name   | <i>tokenB</i>     | SystemConfiguration |
| MTE Monitoring Object Name    | N/A               | NULL                |
| MTE Monitoring Attribute Name | N/A               | NULL                |

### Summary

According to the SAP version you are using, a summary context MTE name can have either of the following formats:

```
tokenA\tokenB\...\tokenC\...
- OR -
tokenA\tokenB\tokenC
```

For example:

```
T10\SystemConfiguration\...\InstalledSupportPackages\...
```

Refer to [Table 53: Mapping between summary context MTE name and IBM Workload Scheduler fields on page 280](#) for an explanation about how you report this type of MTE in the IBM Workload Scheduler fields:

**Table 53. Mapping between summary context MTE name and IBM Workload Scheduler fields**

| IBM Workload Scheduler field  | Token of MTE name | In this example...       |
|-------------------------------|-------------------|--------------------------|
| MTE SAP System ID             | <i>tokenA</i>     | T10                      |
| MTE Monitoring Context Name   | <i>tokenB</i>     | SystemConfiguration      |
| MTE Monitoring Object Name    | <i>tokenC</i>     | InstalledSupportPackages |
| MTE Monitoring Attribute Name | N/A               | NULL                     |

## Object MTE

According to the SAP version you are using, an object MTE name can have either of the following formats:

```
tokenA\tokenB\tokenC\tokenD
- OR -
tokenA\tokenB\...\tokenD
```

For example:

```
PR0\amp53_PR0_11\R3Services\Background\
```

Refer to [Table 54: Mapping between object MTE name and IBM Workload Scheduler fields on page 280](#) for an explanation about how you report this type of MTE in the IBM Workload Scheduler fields:

**Table 54. Mapping between object MTE name and IBM Workload Scheduler fields**

| IBM Workload Scheduler field  | Token of MTE name | In this example... |
|-------------------------------|-------------------|--------------------|
| MTE SAP System ID             | <i>tokenA</i>     | PR0                |
| MTE Monitoring Context Name   | <i>tokenB</i>     | amp53_PR0_11       |
| MTE Monitoring Object Name    | <i>tokenD</i>     | Background         |
| MTE Monitoring Attribute Name | N/A               | NULL               |

## Attribute MTE

According to the SAP version you are using, an attribute MTE name can have either of the following formats:

```
tokenA\tokenB\tokenC\tokenD\tokenE
- OR -
tokenA\tokenB\...\tokenD\tokenE
```

For example:

```
PR0\amp53_PR0_11\R3Services\Background\AbortedJobs
```

Refer to [Table 55: Mapping between attribute MTE name and IBM Workload Scheduler fields on page 281](#) for an explanation about how you report this type of MTE in the IBM Workload Scheduler fields:



**Table 55. Mapping between attribute MTE name and IBM Workload Scheduler fields**

| IBM Workload Scheduler field  | Token of MTE name | In this example... |
|-------------------------------|-------------------|--------------------|
| MTE SAP System ID             | <i>tokenA</i>     | PR0                |
| MTE Monitoring Context Name   | <i>tokenB</i>     | amsp53_PR0_11      |
| MTE Monitoring Object Name    | <i>tokenD</i>     | Background         |
| MTE Monitoring Attribute Name | <i>tokenE</i>     | AbortedJobs        |

## Setting correlation rules and action parameters

Optionally, you can use the alert properties listed in [Table 56: Alert properties for correlations on page 281](#) to:

- Define correlation rules between CCMS events.
- Specify additional parameters for the action that is associated with the event rule.

Date and time values are specified in GMT time zone.

**Table 56. Alert properties for correlations**

**Table 56. Alert properties for correlations (continued)**

| CCMS alert property | Console property              | Composer property |
|---------------------|-------------------------------|-------------------|
| MSGCLASS            | XMI Ext Company Name          | XMIExtCompanyName |
| MSGID               | XMI Log Msg ID                | XMILogMsgID       |
| MTCLASS             | Alert MT Class                | AlertMTClass      |
| MTINDEX             | Alert MT Index                | AlertMTIndex      |
| MTMCNAME            | Alert Monitoring Context Name | AlertMTEContext   |
| MTNUMRANGE          | Alert MTE Range               | AlertMTERange     |
| MTSYSID             | Alert MTE System              | AlertMTESys       |
| MTUID               | Alert MT Type ID              | AlertMTTypeID     |
| OBJECTNAME          | Alert Monitoring Object Name  | AlertMonObjName   |
| RC                  | Alert Return Code             | AlertReturnCode   |
| REPORTEDBY          | Alert Reported By             | AlertReportedBy   |
| SEVERITY            | Alert Severity                | AlertSeverity     |
| STATCHGBY           | Alert Changed By              | AlertChangedBy    |
| STATCHGDAT          | Alert Change Date             | AlertChangeDate   |
| STATCHGTIM          | Alert Change Time             | AlertChangeTime   |
| STATUS              | Alert Status                  | AlertStatus       |
| USERID              | User ID                       | UserID            |
| VALUE               | Alert Value                   | AlertValue        |

## Getting alert status and committing alerts by an external task

Learn how to get CCMS alert status and commit CCMS alerts.

Refer to the following sections for details about:

- [Getting CCMS alert status on page 282](#)
- [Committing CCMS alerts on page 284](#)

## Getting CCMS alert status

### About this task

To get the current status of a CCMS alert from IBM Workload Scheduler, use the external task Get Information (GI). To replace the command arguments with the actual values, refer to the output returned by the event rule you defined. For details

about the correspondence between the CCMS properties and the Console and composer properties, see [Table 56: Alert properties for correlations on page 281](#).

From a command line, enter the following command:

The following is an example of how to retrieve the current status of a CCMS alert:

```
r3batch -t GI -c horse10 -- " -t GAS -alsysid T10  
-msgname SAP_CCMS_horse10_T10_00 -aluniquum 0017780869  
-alindex 0000000104 -alertdate 20081007 -alerttime 040356"
```

You are returned the current status of the alert.

## Committing CCMS alerts

### About this task

The CCMS alerts that you defined as IBM Workload Scheduler events are not automatically committed after their processing. To commit an alert that was processed by IBM Workload Scheduler, use the external task Put Information (PI).

To replace the command arguments with the actual values, refer to the output returned by the event rule you defined. For details about the correspondence between the CCMS properties and the Console and composer properties, see [Table 56: Alert properties for correlations on page 281](#).

From a command line, enter the following command:

### Command syntax

```
-r3batch -t PI -c XA_Unique_ID -- " -t CA -alsysidsap_system_ID -msegnamealert_mte_segment -
aluniquumalert_UID -alindexalert_index -alertdatealert_date -alerttimealert_time "
```

Where:

#### **-t PI**

Identifier of the task to be performed, in this case PI (Put Information).

#### **-c Agent\_name**

The name of the dynamic agent workstation or the unique identifier for the extended agent workstation connected to the SAP system where the MTE for which the alert was raised is located. For information about retrieving the unique identifier for the extended agent workstation, see [UNIQUE\\_ID on page 49](#).

#### **-t CA**

Identifier of the task to be performed, in this case CA (Commit Alert).

#### **-alsysid sap\_system\_ID**

Identifier of the SAP system where the MTE for which the alert was raised is located. If the name contains blanks, enclose it between single quotes.

#### **-msegname alert\_monitoring\_segment**

Name of the alert monitoring segment. You can specify from 1 to 40 characters.

#### **-aluniquum alert\_UID**

Unique identifier of the alert, made up of 10 characters.

#### **-alindex alert\_index**

Alert index, made up of 10 characters.

#### **-alertdate alert\_date**

Date of the alert, in the format *yyyymmdd*.

**-alerttime alert\_time**

Time of the alert, in the format *hhmmss*.

The following is an example of how to commit a CCMS alert:

```
r3batch -t PI -c horse10 -- " -t CA -alsysid T10
-mseaname SAP_CCMS_horse10_T10_00 -aluniquum 0017780869
-alindex 0000000104 -alertdate 20081007 -alervertime 040356"
```

You are returned with the message `The CCMS alert was successfully confirmed.`

## Example of an event rule based on CCMS alerts

The following example shows an event rule defined to monitor the yellow alerts raised on the MTE named `GS0\ALE/EDI` `GS0(000) Log.sys TVALE\Inbound IDoc ORDER_IDOC\Inbound: IDoc generated`. The MTE is configured to generate a yellow alert when the number of IDocs representing orders ready to process exceeds a specified threshold. If this condition occurs, the following actions are triggered:

- An IBM Workload Scheduler job is submitted to process the order IDocs.
- An IBM Workload Scheduler job, with priority 10, is submitted to confirm the alert.

```
<?xml version="1.0" encoding="UTF-8"?>
<eventRuleSet xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns="http://www.abc.com/xmlns/prod/tws/1.0/event-management/rules"
  xsi:schemaLocation="http://www.abc.com/xmlns/prod/tws/1.0/event-management/rules
  http://www.abc.com/xmlns/prod/tws/1.0/event-management/rules/EventRules.xsd">
  <eventRule name="SCENARIO1_XAL" ruleType="filter" isDraft="yes">
    <eventCondition name="MTEEventRaised1" eventProvider="SapMonitor"
      eventType="CCMSEventGenerated">
      <filteringPredicate>
        <attributeFilter name="Workstation" operator="eq"
          <value>SAP_XA</value>
        </attributeFilter>
        <attributeFilter name="InputSAPSystemID" operator="eq"
          <value>GS0</value>
        </attributeFilter>
        <attributeFilter name="InputMonitoringContextName" operator="eq"
          <value>ALE/EDI GS0(000) Log.sys TVALE</value>
        </attributeFilter>
        <attributeFilter name="InputMonObjectName" operator="eq"
          <value>Inbound IDoc ORDER_IDOC</value>
        </attributeFilter>
        <attributeFilter name="InputMonFieldName" operator="eq"
          <value>Inbound: IDoc generated</value>
        </attributeFilter>
      </filteringPredicate>
    </eventCondition>
    <action actionProvider="TWSAction" actionType="sbj" responseType="onDetection">
      <parameter name="JobUseUniqueAlias">
        <value>>false</value>
      </parameter>
      <parameter name="JobDefinitionWorkstationName">
        <value>SAP_XA</value>
      </parameter>
    </action>
  </eventRule>
</eventRuleSet>
```

```

    <parameter name="JobAlias">
      <value>IDOC_{{MTEEventRaised1.AlertUID}}/value>
    </parameter>
    <parameter name="JobDefinitionName">
      <value>PROCESS_ORDER/value>
    </parameter>
  </action>
  <action actionProvider="TWSAction" actionType="sbd" responseType="onDetection">
    <parameter name="JobUseUniqueAlias">
      <value>>false/value>
    </parameter>
    <parameter name="JobWorkstationName">
      <value>TWS_HOST_FTA/value>
    </parameter>
    <parameter name="JobTask">
      <value>C:\TWA_home\methods\r3batch -t PI
        -c {{MTEEventRaised1.Workstation}} -- "
        -t CA -ALYSID {{MTEEventRaised1.AlertSAPSystemID}}
        -MSEGNAM {{MTEEventRaised1.AlertMTESegment}}
        -ALUNIQU {{MTEEventRaised1.AlertUID}}
        -ALINDEX {{MTEEventRaised1.AlertIndex}}
        -ALERTDATE {{MTEEventRaised1.AlertDate}}
        -ALERTTIME {{MTEEventRaised1.AlertTime}} "
      </value>
    </parameter>
    <parameter name="JobPriority">
      <value>10</value>
    </parameter>
    <parameter name="JobType">
      <value>Command</value>
    </parameter>
    <parameter name="JobAlias">
      <value>CONFIRM_{{MTEEventRaised1.AlertUID}}</value>
    </parameter>
    <parameter name="JobStreamName">
      <value>CONFIRM_STREAM</value>
    </parameter>
    <parameter name="JobLogin">
      <value>twuser</value>
    </parameter>
  </action>
</eventRule>
</eventRuleSet>

```

## National Language support

The National Language support feature allows you to install [SAP](#) on a localized IBM Workload Scheduler workstation and use localized characters for IBM Workload Scheduler job names, job streams, and SAP variants.

Using the local and global configuration files, you can set up [SAP](#) to use different code pages and languages for both its output and its connection with a remote SAP system.

As described in [Unicode support on page 140](#), this version of Access method for SAP features Unicode, which is widely supported by SAP systems since version 4.7. However, if either the workstation running [SAP](#) or the target SAP systems do not support Unicode, this section describes how you configure code pages and national languages for [SAP](#).

## Setting National Language support options

The following options control the code page and national language used by Access method for SAP, when Unicode support is not used:

### TWSXA\_CP

The code page used to establish the connection between `r3batch` and the target SAP system.

If you are running a non-Unicode version of `r3batch`, set this option to the code page installed on the SAP system (for a list of the valid code pages, refer to [SAP supported code pages on page 288](#)). The default value is the SAP code page 1100, similar to the standard ISO8859-1. In all other cases, this option is ignored.

### TWSXA\_LANG

The language that `r3batch` uses to log in. It can be one of the following (DE, EN, and JA can be set from the Option Editor. The other languages can be set using any text editor):

- Brazilian Portuguese (pt\_BR)
- English (EN, the default value)
- French (FR)
- German (DE)
- Italian (IT)
- Japanese (JA)
- Korean (KO)
- Simplified Chinese (zh\_CN)
- Spanish (ES)
- Traditional Chinese (zh\_TW)



### TWSMETH\_CP

The code page that `r3batch` uses for its output. The default is the code page used by the IBM Workload Scheduler workstation that hosts `r3batch`.

Ensure that the `TWSMETH_CP` and `TWSMETH_LANG` options are consistent.

### TWSMETH\_LANG

The catalog language used by `r3batch`. The default is the language used by the IBM Workload Scheduler workstation that hosts `r3batch`.

Ensure that the `TWSMETH_CP` and `TWSMETH_LANG` options are consistent.

## SAP supported code pages

To communicate with SAP systems, Access method for SAP uses the following code pages. Use these values to set option `TWSXA_CP`, only when `r3batch` does not support Unicode.

**Table 57. SAP supported code pages**

| SAP code pages | Description                       |
|----------------|-----------------------------------|
| 1100           | 8859-1, this is the default value |
| 1103           | MS 850                            |
| 8000           | SJIS: Shift JIS                   |
| 8300           | BIG5: Traditional Chinese         |
| 8400           | GBK: Simplified Chinese           |

## Troubleshooting

Learn what to do if you get any problems while installing or using IBM Workload Scheduler access methods or plug-ins.

### Troubleshooting the SAP connection

If you are unable to submit SAP jobs using IBM Workload Scheduler after the R/3 configuration, perform the following tests:

- Ensure that you can ping the SAP system from the IBM Workload Scheduler system. This shows basic network connectivity.
- Note that using the SAP routers to access the R/3 system could exceed the size of internal buffers of the RFC library used to store the hostname of the SAP system. When this occurs, the hostname gets truncated, causing the connection to the R/3 system to fail. To work around this problem, do not fully qualify the name of the SAP routers or alternatively use the IP addresses.
- Run the following **telnet** command to verify connectivity:

```
telnet systemname 33xx
```

where *systemname* is the system name or IP address of the SAP server and *xx* is the SAP instance.

If the command fails to complete, this means that communication between `r3batch` and the SAP application server is down.

- Log on to the SAP system as an administrator and verify that the IBM Workload Scheduler RFC user (created in the [Creating the IBM Workload Scheduler RFC user on page 130](#)) exists.
- If the SAP gateway truncates the connection string, replace the host name with the IP address.
- If `r3batch` runs on an AIX® system that does not use U.S. English, make sure that the U.S. Language Environment® is installed on both the IBM Workload Scheduler workstation and the SAP database workstation. Otherwise the error `BAD TEXTENV` (or a similar error message) might appear in the `dev_rfc` trace file and connections to SAP fail.



## Other known problems

Table 58: Miscellaneous troubleshooting items on page 289 lists miscellaneous troubleshooting problems.

**Table 58. Miscellaneous troubleshooting items**

| Area  | Item  |
|---|---|
| <p><code>r3batch</code> and <code>r3event</code>: output contains unreadable characters</p> | <p><b>Symptom:</b> When you enter the <code>r3batch</code> and <code>r3event</code> commands interactively (for example, to export an SAP calendar) the output is returned in UTF-8 format.</p> <p><b>Solution:</b> To resolve this problem, you can either use a shell that supports the UTF-8 code page or redirect the output to a file and open it with a text editor that supports the UTF-8 format.</p>   |
| <p><code>r3batch</code>: SAP jobs contain quotation marks (") or reverse quotes (`)</p>     | <p><b>Symptoms:</b> SAP jobs whose names contain quotation marks or reverse quotes are not displayed in the pick list of the Dynamic Workload Console.</p> <p>-OR-</p> <p>You have an IBM Workload Scheduler job that tries to submit an SAP job whose name contains quotation marks, but it abends with an error. The following message might be displayed:</p> <pre data-bbox="402 968 1458 1026">EEW00439E The required options are not specified either in the global or in the local options file.</pre> <p><b>Solution:</b> In your SAP system, make a copy of the SAP job and assign it a name that does not contain quotation marks or reverse quotes.</p>  |
| <p><code>r3batch</code>: SAP job containing Arabic characters.</p>                          | <p><b>Symptom:</b> An SAP job abends when the job contains Arabic characters.</p> <p><b>Solution:</b> If you run an SAP job that contains Arabic characters, you must set the local codepage of the agent workstation hosting the <code>r3batch</code> access method to the Arabic codepage. Refer to the <code>twsmeth_cp</code> keyword in the common options file, <a href="#">Defining the common options on page 150</a>.</p>  |
| <p><code>r3batch</code>: error messages submitting a job on dynamic agents.</p>             | <p><b>Symptom:</b> When working with dynamic workstations and performing actions such as: displaying a process chain, restarting a process chain, or retrieving the spool list, the following messages might be displayed from the Dynamic Workload Console:</p> <pre data-bbox="402 1472 1458 1530">EEW00439E The required options are not specified either in the global or in the local options file.</pre> <pre data-bbox="402 1545 1458 1604">EEW01065W The environment variable UNISON_JOB is not set. The process chain cannot be restarted.</pre> <p><b>Solution:</b> These messages might indicate that the requested action is not supported on dynamic workstations. Refer to the <i>IBM Workload Scheduler Release Notes®</i> for more information about IBM Workload Scheduler features and minimum required versions for compatibility.</p> |

**Table 58. Miscellaneous troubleshooting items**

(continued)

| Area  | Item   |
|---|--|
| <p>r3batch: r3batch hangs when performing actions from the Dynamic Workload Console.</p>                                      | <p><b>Symptoms:</b> r3batch hangs when performing actions from the Dynamic Workload Console such selecting from a pick list, submitting a job, or similar actions that require connection to the SAP system. The IBM Workload Scheduler joblog might also contain multiple "Timer expired" messages.</p> <p><b>Solution:</b> This problem is caused by the IBM Workload Scheduler logging and tracing component. There are two possible solutions:</p> <ul style="list-style-type: none"> <li>• Deactivate the tracing utility as described in the following technote: <a href="http://www.ibm.com/support/docview.wss?uid=swg21503284">http://www.ibm.com/support/docview.wss?uid=swg21503284</a>.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Modify the <code>r3batch.properties</code> files. Locate the <code>3batch.trace.handlers.traceFile.MPFileSemKeyproperties</code> setting, and then either comment this property setting out or use a different value. Choose any numeric value and retry the operation.</li> </ul> |
| <p>r3batch: Submit same process chain in parallel fails.</p>  | <p><b>Symptom:</b> The SAP system returns an error message RFC_ERROR_SYSTEM_FAILURE when starting an SAP process chain.</p> <p><b>Solution:</b> Verify if the corrections stated in SAP note 1723482 are applied to your SAP Business Warehouse system or avoid running the same process chain more than once simultaneously.</p>  |
| <p>r3batch: When you restart the process of a subchain, the status of the original process chain is not changed to active</p> | <p><b>Symptom:</b> When you restart the process of a subchain, the status of the original process chain is not changed to active.</p> <p><b>Solution:</b> Refer to SAP Note 1075876.</p>   |
| <p>r3batch: Refresh an SAP process chain after a kill action on a running job instance.</p>                                   | <p><b>Symptom:</b> If you perform a kill action on an IBM Workload Scheduler job instance running on a dynamic workstation which monitors an SAP process chain, and then subsequently perform a Refresh operation on this job, the job fails.</p> <p><b>Solution:</b> You cannot perform a Refresh operation after having performed a kill action on an IBM Workload Scheduler job instance running on a dynamic workstation which monitors an SAP process chain. Verify the status of the SAP process chain on the SAP system, and then set the IBM Workload Scheduler job status accordingly.</p>  |
| <p>r3batch: Wrong characters are</p>  | <p><b>Symptom:</b> Special characters such as, &lt; (less than), &gt; (greater than), or the ' (apostrophe) specified in the <b>Description</b> field of the <b>Create criteria profile</b> dialog are displayed incorrectly.</p>  |

Table 58. Miscellaneous troubleshooting items

(continued)

| Area  | Item   |
|---|--|
| displayed in the Criteria Manager profile description.              | <b>Solution:</b> Avoid using special characters in the <b>Description</b> field when creating a new criteria profile.  |
| r3evmon:<br>monitoring events is not started, stopped, or performed | <p><b>Symptom:</b> You cannot start or stop event monitoring, or event monitoring is not performed.</p> <p><b>Solution:</b> Ensure that <i>TWSuser</i> is the owner of the following files, and that the user has read and write permissions:</p> <ul style="list-style-type: none"> <li>• <code>/TWA_DATA_DIR/pids/XAname_r3evmon.pid</code></li> <li>• <code>/TWA_DATA_DIR/EIF/XAname_r3evmoncache.dat</code></li> <li>• <code>/TWA_DATA_DIR/EIF/XAname_r3evmoneif.conf</code></li> <li>• <code>/TWA_DATA_DIR/methods/r3evmon_cfg/XAname_r3evmon.cfg</code></li> <li>• <code>/TWA_DATA_DIR/methods/r3evmon_cfg/XAname_r3idocmon.cfg</code></li> <li>• <code>/TWA_DATA_DIR/methods/r3evmon_cfg/XAname_r3xalmon.cfg</code></li> <li>• <code>/TWA_DATA_DIR/methods/r3evmon_cfg/XAname_r3evmon.lck</code></li> </ul> <p>On Windows™ workstations, these files are located in the <i>TWA_home</i> directory and not in the <i>TWA_DATA_DIR</i> directory.</p> |
| r3batch:<br>monitoring SAP events is not performed                  | <p><b>Symptom:</b> The SAP event on which the event rule is based is neither monitored nor committed.</p> <p><b>Solution:</b> Ensure that the extended agent workstation you specified in the SAP event definition exists. When you define an SAP event within an event rule, no check on the extended agent workstation is made: if the workstation does not exist, the event rule is saved and activated but it will never be resolved.</p>  |
| r3batch:<br>monitoring SAP events is not performed                  | <p><b>Symptom:</b> With XBP 3.0, the SAP event is raised but IBM Workload Scheduler is not notified and therefore does not act as expected.</p> <p><b>Solution:</b> Ensure that the SAP event was not excluded from logging in the SAP event history table.</p>  |
| r3batch:<br>monitoring SAP events is not performed                  | <p><b>Symptom:</b> The SAP events on which the event rule is based are not monitored nor committed.</p> <p><b>Solution:</b> The SAP events being monitored are listed in the following file:</p> <pre style="background-color: #f0f0f0; padding: 5px;"><code>TWA_DATA_DIR/monconf/XAname_r3evmon.cfg</code></pre> <p>where <i>XAname</i> is the name of the SAP extended agent workstation.</p> <p>Check that the file is updated and contains the current monitoring plan. The SAP events are indicated by the following keyword (one for each SAP event on the same extended agent):</p> <pre style="background-color: #f0f0f0; padding: 5px;"><code>!R3EVENT SAP_event_name_lengthSAP_event_name[SAP_event_parm_lengthSAP_event_parm]</code></pre>  |

**Table 58. Miscellaneous troubleshooting items**

(continued)


| Area | Item   |
|------|--|
|      | <p>where:</p> <p><b>SAP_event_name_length</b></p> <p>The length of the SAP event name to monitor, in the format <i>nnnn</i>. For example, 0008, if the event name is <code>SAP_TEST</code>.</p> <p><b>SAP_event_name</b></p> <p>The name of the SAP event to monitor.</p> <p><b>SAP_event_parm_length</b></p> <p>The length of the parameter associated with the SAP event to monitor, if any. The format is <i>nnnn</i>. For example, 0007, if the event name is <code>SAP_PAR</code>.</p> <p><b>SAP_event_parm</b></p> <p>The parameter associated with the SAP event to monitor, if any. This value is optional, but omitting it identifies an SAP event with no parameter associated. For details about how the events are matched between <code>r3evmon.cfg</code> and the SAP system, see <a href="#">SAP events matching criteria on page 261</a>.</p> <p>For each configuration file, an <code>r3evmon</code> process is started to monitor the SAP events listed. To start an <code>r3evmon</code> monitoring process for a specific extended agent workstation, enter the following command.</p> <p> <b>Note:</b></p> <ol style="list-style-type: none"> <li>1. For UNIX® only, <code>r3evmon</code> must be entered by the owner of the IBM Workload Scheduler installation:</li> <li>2. If you run <code>r3evmon</code> from a Windows™ DOS shell, the command prompt is not returned until the process completes.</li> </ol> <pre>r3evmon -t SEM -c XA_Unique_ID -- "[-EIFSRV EIF_server -EIFPORT EIF_port]"</pre> <p>where:</p> <p><b>XA_Unique_ID</b></p> <p>The unique identifier of the extended agent workstation. For information about retrieving the unique identifier for the extended agent workstation, see <a href="#">UNIQUE_ID on page 49</a>.</p> |

Table 58. Miscellaneous troubleshooting items

(continued)

| Area  | Item   |
|---|--|
|   | <p><b>EIF_server</b></p> <p>The host name or IP address of the master domain manager.</p> <p><b>EIF_port</b></p> <p>The port that the master domain manager uses to receive the event notification.</p> <p><b>Symptom:</b> The events on which the event rule is based are not monitored or no event is generated during IDoc monitoring.</p> <p><b>Solution:</b> The events being monitored are listed in the following file:</p> <pre>TWA_DATA_DIR/monconf/XAname_r3evmon.cfg</pre> <p>where <code>XAname</code> is the name of the SAP extended agent workstation. It is the same file that is used to monitor SAP events in general.</p> <p>Check that the file is updated and contains the current monitoring plan. The events corresponding to the <code>IDOCEventGenerated</code> event type are indicated by the following keyword (one for each event on the same extended agent):</p> <pre>!IDOC nnnn&lt;Client Number&gt;nnnn&lt;IDoc Status List&gt;nnnn&lt;Direction&gt;nnnn&lt;Receiver Port&gt; nnnn&lt;Receiver Partner Type&gt;nnnn&lt;Partner Function of Receiver&gt; nnnn&lt;Partner Number of Receiver&gt;nnnn&lt;Sender Port&gt;nnnn&lt;Sender Partner Type&gt; nnnn&lt;Partner Function of Sender&gt;nnnn&lt;Partner Number of Sender&gt; nnnn&lt;Message Type&gt;nnnn&lt;IDoc Type&gt;nnnn&lt;Logical Message Variant&gt; nnnn&lt;Logical Message Function&gt;nnnn&lt;Test Flag&gt;nnnn&lt;Output Mode&gt;</pre> <p>where:</p> <p><b>nnnn</b></p> <p>The length of the IDoc field. For example, <code>0005</code> indicates the value of an IDoc status list corresponding to <code>56,60</code>.</p> <p><b>&lt; &gt;</b></p> <p>Contains the value of the field associated with the IDoc to be monitored. For a list of the supported IDoc fields, refer to <a href="#">Table 47: IBM Workload Scheduler fields used to define event rules based on IDocs on page 266</a>.</p> <p>For each configuration file, an <code>r3evmon</code> process is started to monitor the events listed. Make sure that an <code>r3evmon</code> monitoring process is started for the involved extended agent workstation.</p> |
| <p><code>r3evmon</code>:<br/>monitoring SAP<br/>and IDoc events</p> | <p><b>Symptom:</b> Memory consumption increases continuously during monitoring of IDoc and standard SAP events.</p> <p><b>Solution:</b> Refer to SAP Notes® 1021071 and 1109413.</p>   |

**Table 58. Miscellaneous troubleshooting items**

(continued)

| Area  | Item  |
|---|---|
| <p>increases memory consumption</p> <p><code>r3batch</code>: Duplicated events generated during IDoc monitoring</p> | <p><b>Symptom:</b> The action defined in an event rule with <code>IDOCEventGenerated</code> event type is unexpectedly repeated.</p> <p><b>Solution:</b> Reset the start date and time for the next monitoring loop. These values are stored in the following file:</p> <pre data-bbox="397 667 1458 709">&lt;data_dir&gt;/methods/r3evmon_cfg/XAname_r3idocmon.cfg</pre> <p>where <code>XAname</code> is the name of the SAP extended agent workstation. Therefore you can either:</p> <ul style="list-style-type: none"> <li>• Stop <code>r3evmon</code>, delete the <code>XAname_r3idocmon.cfg</code> file and then start <code>r3evmon</code> again.</li> <li>- OR -</li> <li>• Stop <code>r3evmon</code>, set the date and time in the <code>XAname_r3idocmon.cfg</code> file to the values you want, and start <code>r3evmon</code> again.</li> </ul> <p>Use the following format for the start date and time:</p> <pre data-bbox="397 1087 1458 1150">start_date=YYYYMMDD start_time=HHMMSS</pre> <p>For example:</p> <pre data-bbox="397 1234 1458 1297">start_date=20080307 start_time=115749</pre> <p>Check the value of the <code>idoc_no_history</code> option:</p> <ul style="list-style-type: none"> <li>• If it is set to OFF and no <code>XAname_r3idocmon.cfg</code> file exists, then all matching IDocs are retrieved, not only the current ones.</li> <li>• If it is set to ON (default value), check the date and time in the <code>XAname_r3idocmon.cfg</code> file.</li> </ul> |
| <p><code>r3batch</code>: No event is generated during IDoc monitoring</p>   | <p><b>Symptom:</b> The expected event actions are not triggered.</p> <p><b>Solution:</b> Check the value of the <code>idoc_no_history</code> option; if it is set to ON (default value), check the date and time in the <code>XAname_r3idocmon.cfg</code> file.</p>   |
| <p>Error defining an internetwork dependency based on SAP event</p>   | <p><b>Symptom:</b> If you work with XBP 2.0, when you try to define an internetwork dependency based on an SAP event, the following error message is displayed:</p> <pre data-bbox="397 1768 1458 1852">*** ERROR 778 *** EEW00778E An internal error has occurred. The program could not modify the following job: Job name:</pre>   |

Table 58. Miscellaneous troubleshooting items

(continued)

| Area   | Item   |
|--|--|
|  | <p>Job ID:<br/>%CJ ERROR</p> <p><b>Solution:</b> Perform the following steps:</p> <ol style="list-style-type: none"> <li>1. Check if the BCTEST report is defined in your SAP system by invoking either one of the following transactions: <ul style="list-style-type: none"> <li><b>sa38</b><br/>Enter BTC* and click the picklist button. In the panel that opens, click the picklist button and check if BTCTEST is shown in the list that is displayed.</li> <li><b>se38</b><br/>Enter BTC* and click the picklist button. Check if BTCTEST is shown in the list that is displayed.</li> </ul> </li> <li>2. If report BTCTEST is not found in the list, you can either: <ul style="list-style-type: none"> <li>◦ Choose another existing report, and, in the local options file, set the placeholder_abap_step option to the name you chose. Because the report assigned to the placeholder job is run when the corresponding event is raised, ensure that you choose a dummy report. For details about the placeholder_abap_step option, see <a href="#">Table 31: r3batch common configuration options on page 151</a>.</li> <li>- OR -</li> <li>◦ Set the placeholder_abap_step option to a custom developed ABAP code of your choice.</li> </ul> </li> </ol> |
| <p>r3batch: error message when scheduling SAP jobs</p> | <p><b>Symptom:</b> When creating an SAP job, the following message is displayed while trying to view the details of an ABAP's variant:</p> <pre>AWS00101E Missing ABAP routine. J_101_REPORT_ALL_SELECTIONS please install the latest ABAP routine for Maestro!!</pre> <p><b>Solution:</b> This defect is caused by an error in an SAP function module. SAP describes this problem and possible solutions in the SAP Notes® 0351293 and 0116354.</p>   |
| <p>r3batch: modify job step error</p>                  | <p>You change print parameters with the <code>BAPI_XBP_MODIFY_JOB_STEP</code> function module, and subsequently, they are incorrect. As a consequence, r3batch gets error 221:</p> <pre>MSG_CANNOT_GET_PRIARC_PARAMS: "Retrieving new print and archive parameters failed"</pre> <p>The problem is solved by installing SAP Note 758829.</p>   |

**Table 58. Miscellaneous troubleshooting items**

(continued)

| Area   | Item   |
|--|--|
| <p><code>r3batch</code>: modify job step error</p>   | <p>The BAPI_XBP_MODIFY_JOB_STEP function module always uses the name of the logged-on user as the name for the step user. In this case, when submitting a job with the <code>-vX</code> options, <code>r3batch</code> creates a job by copying all the data from the original template, except the variant name of the first step (which is provided as the option parameter). This procedure is usually referred to as the "old copy". However, when adding a step to a new job, the XBP 2.0 interface ignores the user parameter passed by <code>r3batch</code>.</p> <p>The problem is solved by installing SAP note 758829.</p>   |
| <p><code>r3batch</code>: does not start after installation on Windows™</p>   | <p><b>Symptom:</b> After installing or upgrading the SAP R/3 access method to version 8.5 on a Windows™ operating system, you try to start <code>r3batch</code> but nothing happens. The following message is displayed:</p> <pre data-bbox="402 783 1458 846">The application failed to initialize properly. Click on OK to terminate the application.</pre> <p><b>Solution:</b> Ensure that you applied the SAP Note 684106 to install the required Microsoft™ DLLs.</p>   |
| <p><code>r3batch</code>: IBM Workload Scheduler environment variables are not resolved when specified in the task string for an R/3 batch job.</p> | <p><b>Symptom:</b> When IBM Workload Scheduler environment variables are used in the task string for an R/3 batch job and the job is launched, the environment variables are not resolved. The exact string used to specify the variable is used instead.</p> <p><b>Solution:</b> To leverage IBM Workload Scheduler environment variables, you must modify the access method as follows:</p> <ol style="list-style-type: none"> <li>In the <code>TWA_DATA_DIR/methods</code> directory, create a file named, <code>r3batch.cmd</code> (on Windows™) or <code>r3batch.sh</code> (on UNIX®) as required, containing the following content: <pre data-bbox="483 1270 1458 1360">@echo off set METHODSPATH=%~dp0 call "%METHODSPATH:=%r3batch.exe" %*</pre> </li> <li>Modify the CPU XAGENT definition from <code>r3batch</code> to <code>r3batch.cmd</code>. An example follows: <pre data-bbox="483 1430 1458 1724">CPUNAME NW1 DESCRIPTION "r3batch" OS OTHER NODE none TCPADDR 31111 FOR MAESTRO HOST STROMBOLI ACCESS "r3batch.cmd" TYPE X-AGENT AUTOLINK OFF BEHINDFIREWALL OFF FULLSTATUS OFF END</pre> </li> <li>To modify the CPU access method in the Symphony® file, run JnextPlan as follows: <pre data-bbox="483 1787 1458 1822">JnextPlan -for 0000</pre> </li> </ol> |



Table 58. Miscellaneous troubleshooting items

(continued)

| Area  | Item  |
|---|---|
| <p>@longlink file present in installation directory</p> | <p><b>Symptom:</b> After installing IBM® Workload Scheduler on a computer with an AIX® operating system where a master domain manager is already installed, a @longlink file containing the following is present in the installation directory:</p> <pre data-bbox="397 525 1458 598">methods/_tools/_jvm_64/lib/desktop/icons/HighContrastInverse/48x48/mimetypes/gnome-mime-text-x-java.png</pre> <p><b>Solution:</b> The file can be ignored. It does not present any problems for the proper functioning of the product.</p>  |
| <p>Job throttling does not start on HP-UX</p>           | <p><b>Symptom:</b> You try to start the job throttler and the following error message is displayed:</p> <pre data-bbox="397 766 1458 829">Error occurred during initialization of VM java.lang.NoSuchMethodError: java.lang.Thread.start()V Abort</pre> <p><b>Cause and Solution:</b> Java™ version 1.5 does not start because there are symbolic links of Java™ version 1.4 libraries used by third party products. For example, you might have <code>/usr/lib/pa20_64/libjava.sl</code> linked to <code>/opt/java1.4/jre/lib/PA_RISC2.0W/libjava.sl</code></p> <p>Before starting the job throttling again, change the PATH and SHLIB_PATH environment variables as follows:</p> <pre data-bbox="397 1092 1458 1218">PATH=TWA_DATA_DIR/methods/_tools/_jvm_64/lib/PA_RISC2.0W:\$PATH export PATH SHLIB_PATH=TWA_DATA_DIR/methods/_tools/_jvm_64/lib/PA_RISC2.0W:\$SHLIB_PATH export SHLIB_PATH</pre> <p>To apply this change definitively, edit the <code>jobthrottling.sh</code> file by adding the environment settings after the following line:</p> <pre data-bbox="397 1333 1458 1375">#!/bin/sh</pre> |
| <p>Job throttling does not start</p>                    | <p><b>Symptom:</b> When you start the job throttling feature, nothing happens and the following error message is displayed:</p> <pre data-bbox="397 1480 1458 1606">EEWOJTR0207E Error, another job throttler instance is already running against the same SAP system. Foreign job throttler registration is: Client ID="clientID", Name="TWS4APPS_JOBTHROTTLER",Host="hostname", UID "UniqueID"</pre> <p><b>Cause and Solution:</b> Possible causes are:</p> <ul style="list-style-type: none"> <li>• You are running job interception collector jobs, but the job interception and job throttling features cannot run at the same time. Choose which feature to start. For detailed information, refer to <a href="#">Job interception and parent-child features on page 219</a> and <a href="#">Job throttling feature on page 246</a>.</li> </ul>   |

**Table 58. Miscellaneous troubleshooting items**

(continued)

| Area   | Item  |
|--|---|
|  | <ul style="list-style-type: none"> <li>• Another job throttler instance is running against the same SAP system. You can start only one job throttler instance.</li> <li>• A previous job throttler instance created an exclusive lock object on the SAP system that could have become permanent. To verify it, use transaction <code>sm12</code> and query for the lock object named <code>TWS4APPS_JOBTHROTTLER</code>. If the lock object exists, and you are not running any job throttler or job interception instance, remove the lock manually and restart the job throttler.</li> </ul>                    |
| <p>Job throttling does not start</p>   | <p><b>Symptom:</b> When you start the job throttling feature, nothing happens and the following error message is displayed:</p> <pre data-bbox="402 772 1458 804">EEWOJT0209E Error, the password format is not valid.</pre> <p><b>Cause and Solution:</b> Your password is encrypted in old format. To encrypt the password with the correct encryption version, use the <b>enigma</b> or <b>pwdcrypt</b> programs, or the Option Editor. For details about how to encrypt the password, see <a href="#">Encrypting SAP user passwords on page 162</a>.</p>  |
| <p>Job throttling does not stop</p>  | <p><b>Symptom:</b> When you stop the job throttling feature, nothing happens.</p> <p><b>Cause and Solution:</b> You are connected as a <i>TWSUser</i> who does not have write permission on the <code>XAname_jobthrottling_cmd.txt</code> file. To solve this problem, delete the <code>XAname_jobthrottling_cmd.txt</code> file and enter the command again. For detailed information about stopping the job throttler, refer to <a href="#">Step 5. Starting and stopping the job throttling feature on page 249</a>.</p>   |
| <p>Job throttling: alerts for MTEs are not generated according to the threshold values set</p> | <p><b>Symptom:</b> Alerts for the MTEs created by the job throttler are generated without respecting the threshold values that are set.</p> <p><b>Cause and Solution:</b> You started a new job throttler instance, which, being enabled to send data to CCMS, created the related MTEs. When you include the MTEs in your monitoring set, the threshold values are automatically set according to the existing MTE class. Nevertheless, alerts are generated without respecting these values.</p> <p>To solve this problem, edit the MTE properties and save them again, even if you do not change anything.</p> |
| <p>Job throttling: saving MTE properties generates an informational message</p>                | <p><b>Symptom:</b> When you edit and save the properties of MTEs generated by the job throttler, the following informational message is displayed:</p> <pre data-bbox="402 1682 1458 1713">Message does not exist.</pre> <p><b>Cause and Solution:</b> In the pop-up window that displays the message, click <b>Continue</b> and close the Properties window. Your settings are saved.</p>  |

Table 58. Miscellaneous troubleshooting items

(continued)

| Area   | Item  |
|--|---|
| Job throttling: error message displayed when creating trace file on HP operating systems         | <p><b>Symptom:</b> While the job throttler is stopping, there are intercepted jobs to release on exit. The following error message is displayed:</p> <pre>CJL0006E Handler jobthrottling.trace.handlers.file is unable to write a log event.</pre> <p><b>Cause and Solution:</b> The message does not report any real error, and can be ignored.</p>  |
| The system cannot intercept jobs   | <p><b>Symptom:</b> Although the job interception feature is active on the SAP system, the intercepted jobs are kept in scheduled state.</p> <p><b>Cause and Solution:</b> The job throttler feature or the Java™ Virtual Machine used by the job throttler might still be active.</p> <p>On each extended agent where the job throttler was started at least once, ensure that:</p> <ol style="list-style-type: none"> <li>1. You stopped the feature. For details, see <a href="#">Step 5. Starting and stopping the job throttling feature on page 249</a>.</li> <li>2. The Java™ Virtual Machine used by the job throttler was stopped by the process. To search for Java™ processes, use: <ul style="list-style-type: none"> <li><b>On Windows™</b> <p>The Process Explorer</p> </li> <li><b>On UNIX®</b> <p>The command <code>ps -ef   grep throttling</code></p> </li> </ul> <p>If a Java™ Virtual Machine instance related to the job throttler is found, kill it.</p> </li> </ol> |
| access method executables: r3batch, r3event, psagent: permission denied messages in the job log. | <p><b>Symptom:</b> The job log reports multiple "Permission denied" messages.</p> <p><b>Cause and Solution:</b> The root cause might be that the access method executable, for example, r3batch, is submitted by the <code>root</code> user and not the <code>twuser</code>. This creates directories and files with the wrong ownership and file permissions. Verify the ownership of the following directories and files if you are running the product on UNIX® platforms. Ensure that the <code>twuser</code> is the owner of the files and that the user has both read and write permissions on the files, and execute permission on the directories.</p> <pre>TWA_DATA_DIR/methods/traces TWA_DATA_DIR/methods/traces/*.log</pre>   |
| psagent: misleading message displayed if the local options                                       | <p><b>Symptom:</b> The job log shows the following message:</p> <pre>EEW00439E You did not specify the required options either in the global or in the local options file.</pre>  |

**Table 58. Miscellaneous troubleshooting items**

(continued)

| Area   | Item  |
|--|---|
| file has no right permissions                                | <p>but all the mandatory options were correctly set in the options file.</p> <p><b>Solution:</b> Check that the options file has <code>read</code> and <code>write</code> permissions available to the user who is trying to launch the job.</p>  |
| No messages written in the job log                           | <p><b>Symptom:</b> IBM Workload Scheduler does not write any messages in the job log if the file system for tracing is full or the <code>ljuser</code> does not have the correct permission to write in the trace directory.</p>  |
| The submission of a PeopleSoft job fails                     | <p><b>Symptom:</b> The submission of a PeopleSoft job fails and the IBM Workload Scheduler job log contains a Java™ exception similar to the following:</p> <pre data-bbox="397 766 1458 892">Exception in thread "3194" java.lang.ExceptionInInitializerError     at bea.jolt.JoltSessionAttributes.&lt;clinit&gt;(JoltSessionAttributes.java:183)     at psft.pt8.net.JoltSessionPool.createConnection(JoltSessionPool.java:363)     at psft.pt8.net.JoltSessionPool.getJoltSession(JoltSessionPool.java:220)</pre> <p><b>Cause and Solution:</b> The <code>psjoe.jar</code> path contains special characters.</p> <p>Define a path without special characters.</p> |
| The submission of an Oracle job fails                        | <p><b>Symptom:</b> The submission of an Oracle job fails and the IBM Workload Scheduler job log shows the following information:</p> <pre data-bbox="397 1144 1458 1207">EEWP0017 Child MCMLJ exited normally. Exit code: 1.EEWP0027 Error - Launch job failed</pre> <p><b>Solution:</b> Submitting an Oracle job might fail because there is a connection problem to the Oracle database. Verify that your Oracle naming methods are set correctly. For details about how to configure naming methods, refer to the <i>Oracle Net Services Administrator's Guide</i>.</p>  |
| mvsjes: RACF® authorization problem on z/OS® version 1.7     | <p><b>Symptom:</b> An <code>S047</code> abend is returned if the <code>EEWSERVE</code> started task does not have an associated RACF® owner ID.</p> <p><b>Solution:</b> In the RACF® database, associate an authorized RACF® ID with the <code>EEWSERVE</code> started task as specified in <a href="#">Setting RACF authorizations on z/OS on page 86</a>.</p>   |
| To upgrade the SAP environment, perform the following steps: | <ol style="list-style-type: none"> <li>1. Delete the TWS ABAP module.</li> <li>2. Upgrade SAP.</li> <li>3. Install TWS ABAP module.</li> </ol>  |

## Chapter 14. Scheduling jobs on IBM Workload Scheduler from SAP Solution Manager

IBM Workload Scheduler and SAP Solution Manager are integrated to allow the IBM Workload Scheduler engine to run the job scheduling tasks available from the Solution Manager user interface.

The integration is provided by the SMSE Adapter, which runs on the master domain manager. The SMSE Adapter uses the SAP Solution Manager Scheduling Enabler (SMSE) interface provided by SAP to enable *external schedulers* to run the scheduling for Solution Manager.

With this integration, when you schedule a job from the `Scheduling` panel of Solution Manager, IBM Workload Scheduler takes charge of the job scheduling, monitoring, and management tasks, as well as of job triggering and notification.

Under these conditions IBM Workload Scheduler acts as an RFC-Server with a common interface for scheduling jobs. It is identified through an RFC-Destination, registered in the SMSE. The interaction between Solution Manager and IBM Workload Scheduler is based on a PUSH mechanism implemented by the SMSE interface, whereby the master domain manager responds to requests solicited by the Solution Manager job scheduling functions.

Qualified as *external scheduler* by Solution Manager, the registered master domain managers, identified by their RFC destination names, can be called or administered from the `Process Scheduling Adapter` menu item in the Solution Manager GUI.

The jobs scheduled from Solution Manager on IBM Workload Scheduler must have been previously defined in the IBM Workload Scheduler database.

A job scheduled from the `Schedule Jobs` or `Job Documentation` panels in Solution Manager to be run by IBM Workload Scheduler, is automatically mapped in a job stream that is expressly created to include the job.

### Registering the master domain manager on SAP Solution Manager

The first step to run the integration is to register the master domain manager on the SAP Solution Manager system.

To register master domain manager on the SAP Solution Manager system, you must:

1. Have established a connection based on RFC or Web Services between the master and the Solution Manager system.
2. Have the SAP JCo 3.1 Patch 3 ( `sapjco31P_3`) libraries ( `jar` files and, according to your operating system, `dll`, `so`, or `sl`) installed in the `<data_dir>/methods/smseadapter/lib` directory on the master domain manager. To download 3.1 Patch 3 ( `sapjco31P_3`), visit the Sap Service Marketplace.



**Attention:** The libraries require the Microsoft Visual C++ Redistributable Package (vc redistrib) installed.

3. Configure the `smseadapter.properties` file located in the `<data_dir>/methods/smseadapter/lib` directory on the master.

The file contains a `SMSE_ADAPTER_CONNECTION_n` section that can be duplicated depending on the number of connections that you want to define. You can in fact set more connection definitions for the same master, where, for example, the following can vary:

- The SAP Solution Manager system.
- The agent that is to run the workload.
- The SAP user name.



**Note:** A master domain manager can have only one active connection at a time via the `smseadppter`. If the adapter finds more than one section with the `startAdapter` property set to `true` (or not set to `false`), it uses the first section of properties and ignores the others.

4. Stop and start WebSphere Application Server Liberty Base. For further information, see Application server - starting and stopping.

The following is an example of `smseadapter.properties` file:

```
[SMSE_ADAPTER_CONNECTION_1]
startAdapter =
ashost =
sysnr =
client =
sid =
user =
passwd =
lang =
destination =
setDestinationAsDefault =
jobStreamNamePrefix =
agentName =
notificationThreadCheckInterval =
adminConsoleHost =
adminConsolePort =
adminConsoleUser =
adminConsoleUserPassword =
maxRegistrationAttempts =
registrationAttemptInterval =
```

This section can be repeated as many times as needed in the `smseadapter.properties` file.

The properties are:

**Table 59. Properties for the `smseadapter.properties` file.**

| Property                  | Description  | Required | Notes |
|---------------------------|--|----------|-------|
| SMSE_ADAPTER_CONNECTION_1 | This is the section header. If you have more sections the last digit should differ from one section and another. If two sections contain identical property values, only the first section read is considered, the other is ignored. | ✓        |       |

Table 59. Properties for the `smseadapter.properties` file.

(continued)

| Property     | Description   | Required | Notes  |
|--------------|---|----------|--|
| startAdapter | Specifies whether to connect or not to SAP Solution Manager. Can be true or false. Must be set to true to make the connection work. Set to false to temporarily suspend the connection. | ✓        | The default is true.   |
| ashost       | The host name of the SAP Solution Manager server on which the master domain manager registers. For example, /<br>H/7.142.153.8/H/7.142.154.114.   | ✓        | The master domain manager can connect to one Solution Manager system at a time.  |
| sysnr        | The SAP system number of the system that the master registers on. This value must have two digits. For example, 00.   | ✓        |  |
| client       | The SAP client number. For example, 001.  | ✓        |  |
| sid          | The SAP system identifier (SID) that the master registers on. For example, SM1.   | ✓        |  |
| user         | The SAP user name that will be used during the notification process to log into SAP Solution Manager. For example, twsadmin.  | ✓        |  |
| passwd       | The SAP password that will be used during the notification process to log into SAP Solution Manager. You can enter it in clear or in encrypted forms.                                   | ✓        | To encrypt the password use the <code>enigma</code> program located in the <code>methods</code> folder on the master.  |
| lang         | The SAP logon language. For example, EN.  | ✓        |  |
| destination  | A name entered here to identify the RFC Destination that will be used to connect to SAP Solution Manager. For example, IWSM2.   | ✓        | This name defines the logical connection between the Solution Manager system and the master domain manager, referred to in Solution Manager as the <code>external</code> |

**Table 59. Properties for the `smseadapter.properties` file.**

(continued)



| Property                        | Description   | Required | Notes  |
|---------------------------------|---|----------|--|
| setDestinationAsDefault         | <p> <b>Note:</b> The destination name must be univocal.</p> <p>Set to <code>true</code> to make this destination the default one. The default is <code>false</code>.</p> |          | <p><code>scheduler</code>. The complete destination name will then be formed by:</p> <pre>destination@mdm_name</pre> <p>For example: IWSM2@MAS93WIN</p> <p> <b>Note:</b> The destination name must be univocal.</p> <p>Use this property in a context where a Solution Manager system has more than one active destination defined (that is, more registered masters), to set the default external scheduler. If you do not set a default, and you have more external schedulers registered on an SM system, you will have to specify the destination at scheduling time.</p> |
| jobStreamNamePrefix             | <p>A prefix of at least four letters that is to be added to the names of the job streams created when jobs are submitted.</p> <p>The first character must be a letter while the remaining characters can be alphanumeric.</p>                             |          | <p>The default prefix is SOLMAN.</p>   |
| agentName                       | <p>The name of the IWS agent that will run the jobs. When you search for the job definition in the Scheduling dialog, the Search utility returns the names of the jobs defined to run on this agent.</p>  |          | <p>If no agent name is specified, the Search utility returns the names of the jobs defined to run on all the agents attached to the master domain manager (unless you use filtering).</p>  |
| notificationThreadCheckInterval | <p>The time interval, in seconds, between checks made by the notification thread on the status changes of a job. The default is 5 seconds.</p>  |          | <p>The thread notifies Solution Manager with the status changes of a job.</p>  |
| adminConsoleURL                 | <p>The protocol used (http or https) and the host name and port of the Dynamic Workload Console attached to the master. For example,</p> <pre>https://mydwc:port_number/abc/console.</pre>  |          | <p>The next four properties, all related to the Dynamic Workload Console, are optional, but if you specify one, you must specify all.</p>  |



Table 59. Properties for the `smseadapter.properties` file.

(continued)

| Property                                 | Description  | Required | Notes |
|--|--|----------|-------|
| <code>adminConsoleUser</code>            | The username that logs onto the Dynamic Workload Console attached to the master.                       |          |       |
| <code>adminConsoleUserPassword</code>    | The password of the username that logs onto the Dynamic Workload Console attached to the master.       |          |       |
| <code>maxRegistrationAttempts</code>     | The maximum number of attempts to connect to SAP. By default, it is set to 5 times.                    |          |       |
| <code>registrationAttemptInterval</code> | The time after which a new attempt to connect to SAP is performed. By default, it is set to 5 seconds. |          |       |



**Note:** If the language configured for the master domain manager is different from the language configured for the Solution Manager system, the messages issued in the Solution Manager user interface may be displayed in mixed languages.

## Scheduling

The `Job Management Administration` panel of Solution Manager has two entry points for scheduling jobs:

- The `Schedule Jobs` item in `Common Tasks`, a direct way of scheduling, where you pick the job from the IBM Workload Scheduler database and you set the scheduling options and time definitions.
- The `Job Documentation` object, where you can create and edit job documentation, schedule, monitor, and manage jobs.

The jobs scheduled from Solution Manager on IBM Workload Scheduler must have been previously defined in the IBM Workload Scheduler database.

A job scheduled from the `Schedule Jobs` or `Job Documentation` panels in Solution Manager to be run by IBM Workload Scheduler, is automatically mapped in a job stream that is expressly created to include the job. The job stream is (automatically) defined in the IBM Workload Scheduler database with a specific prefix defined in the [smseadapter.properties file on page 304](#).

## Scheduling jobs directly

In the Scheduling panel, before you can proceed to enter the job name and the scheduling details, you are asked to specify the identity of the scheduling system and the scheduler type, which must be SMSE. You can then specify the name of the job definition, and the job type, which can be any of the job types supported by IBM Workload Scheduler. The job is qualified by Solution Manager as an `external` job.

Select the `Status message` check box to enable monitoring tasks for the job.

In the `Start Conditions` section select when and how frequently the job will run and optionally make selections in the `Repeat every` and `Time Period` groups. Your selections are then mapped to matching run cycles, `valid from` and `valid to` dates, working days or non- working days, and time dependencies on IBM Workload Scheduler.



**Note:** The Extended Window start condition is not supported. All other start conditions are supported.

Use the tabs available on the uppermost part of the panel to manage jobs; for example, to copy, reschedule, release, kill, or cancel a job, create and see external notes, and check external logs.

If a scheduled job has not been started, you can change its start conditions or parameters and click **Schedule/Change Externally** again. Alternatively, you can change the start conditions and select **Reschedule** to reset the job to a new start time. In either case, IBM Workload Scheduler deletes the current job instance (that has not been started) and creates another one with the new characteristics.

On the other hand, you can click **Cancel** on a non-completed job that was already started. In this case, IBM Workload Scheduler deletes the running instance as expected.

As soon as the job is scheduled with success, the external job ID and the status are updated and you can view the job instance on the Dynamic Workload Console.

## Scheduling from job documentation

With the Job Documentation option of the Job Management Administration panel, you can also create job documentation for jobs defined in IBM Workload Scheduler and scheduled from Solution Manager. From the Job Documentation menu you can view and edit job details, including job steps, basic business information, and scheduling information.

To create job documentation:

1. In the Job Documentation view, create job documentation **for a Job with detail UI**.
2. In the General pane of the new job documentation creation page, enter a job documentation name and select **Other** as *Job Type*. Selecting **Other**, *External Scheduler* is automatically selected.
3. Add a step in the Step Overview table.
4. Select a job definition type from a list of job types available from IBM Workload Scheduler.
5. Click **Save** on top of the job documentation creation page.
6. Select the **Systems** tab in the job documentation creation page and add a solution documentation, a logical component group, or a technical scenario for the new job documentation in the *Logical Component Groups, Solution Documentation and Technical Scenarios* table. Click **Save**.
7. Select **Scheduling** in the Systems table to set up scheduling definitions for the job associated with the new job documentation.

This action displays the same Scheduling panel described in [Scheduling jobs directly on page 305](#).

You can also select **Configure Monitoring** in the Systems table to set up monitoring specifications for the job.

## Monitoring

Job status retrieval and job monitoring tasks are run by IBM Workload Scheduler, but you can configure and view them from the Solution Manager `Job Documentation` and `Monitoring` views. In Solution Manager to monitor a job you must configure a Business project monitoring object (BPmon). When monitoring data is requested for a job, Solution Manager through the SMSE adapter requests IBM Workload Scheduler for updates on the job status, logs, alerts.

To view the status of a job in the Solution Manager `Job Documentation` view, provided you selected the `Status message` check box in the `Scheduling` page, follow these steps:

1. Open the job documentation view for the job.
2. Select the `Systems` and the `Scheduling` tabs.
3. In the `Scheduling` page select the `External Log` button.

The job log is displayed in a pop-up window.

4. Select the `Refresh` button of the `External Job Status` field in the `Scheduling` page.

The current status of the job is displayed in the field.

To configure monitoring for a scheduled job with the `Status message` check box selected, go to the `Job Management Administration` panel of Solution Manager and open the `Job Documentation` view related to the job. There, select the `Systems` tab and in the ensuing page select `Configure Monitoring`.

1. In the `Identification` section of the `Job Monitoring Setup` window, input all mandatory fields.
2. Select the `Alert Setting and Data Collection` tab and configure alerts to your convenience.
3. Fill in the mandatory fields in the `Incidents and Notifications` and `Monitoring Activities` tabs.
4. Select the `Mass Generate and Activate` button on top to save and activate the monitoring object.

With the Push mechanism IBM Workload Scheduler forwards to Solution Manager the status changes that a job instance undergoes until it reaches a final status such as `complete`, `canceled`, `error`, or `killed`. IBM Workload Scheduler also forwards the following scheduling time information for the job instance:

- Estimated duration
- Actual start
- Actual completion

On the basis of this information, and according to the alert configuration you specified in the `Alert Setting and Data Collection` pane, Solution Manager triggers these alerts when any of the thresholds you specified are reached or exceeded. This grants you the means to keep the execution of your workload under control.

To view the alerts for a monitored job, select the `Unified Alert Inbox` view in the `Job Management Administration` panel:

1. Select the monitoring object for the job in the `Job Monitoring Standard View`.
2. Refresh the alert list table after some monitoring period.



**Note:** Alert Inbox and Job Monitoring panels can be also accessed from the Home in the Job Management section.

## Setting the traces on the application server for the major IBM Workload Scheduler processes

### About this task

The application server handles all communications between the IBM Workload Scheduler processes. The trace for these communications is set to `tws_info` by default (information messages only). The application server can be set to trace `all` communications, either for the whole product or for these specific groups of processes:

- Command line
- Connector
- Database
- Planner
- Utilities
- Dynamic workload broker

**Significant impact on performance:** Activating traces for the WebSphere Application Server Liberty Base leads to a significant impact on performance, especially if you set the tracing to `all`. Thus you are strongly advised to identify the process group where the problem that you want to trace is occurring, and only set the trace to that group.

To modify the trace level on the WebSphere Application Server Liberty Base, edit the `trace.xml` file as necessary.

Templates for the master domain manager are stored in the following paths:

#### On UNIX operating systems

```
TWA_home/usr/servers/engineServer/configDropins/templates
```

#### On Windows operating systems

```
TWA_home\usr\servers\engineServer\configDropins\templates
```

Templates for the Dynamic Workload Console are stored in the following paths:

#### On UNIX operating systems

```
DWC_home/usr/servers/dwcServer/configDropins/templates
```

#### On Windows operating systems

```
DWC_home\usr\servers\dwcServer\configDropins\templates
```

When you edit the file with your customized settings for the master domain manager, move it to the following paths:

#### On UNIX operating systems

```
TWA_DATA_DIR/usr/servers/engineServer/configDropins/overrides
```

**On Windows operating systems**

```
TWA_home\usr\servers\engineServer\configDropins\overrides
```

When you edit the file with your customized settings for the Dynamic Workload Console, move it to the following paths:

**On UNIX operating systems**

```
DWC_DATA_dir/usr/servers/dwcServer/configDropins/overrides
```

**On Windows operating systems**

```
DWC_home\usr\servers\dwcServer\configDropins\overrides
```

1. Copy the template file from the `templates` folder to a working folder.
2. Edit the template file in the working folder with the desired configuration.
3. Optionally, create a backup copy of the relevant configuration file present in the `overrides` directory in a different directory. Ensure you do not copy the backup file in the path where the template files are located.
4. Copy the updated template file to the `overrides` folder. Maintaining the original folder structure is not required.
5. Changes are effective immediately.

For example, to modify the trace level on WebSphere Application Server Liberty Base, perform the following steps:

1. Copy the `trace.xml` file from the `TWA_home/usr/servers/engineServer/configDropins/templates` folder to a working folder.
2. Edit the template file in the working folder by changing the following string:

```
<variable name="trace.specification" value="*info"/>
```

into

```
<variable name="trace.specification" value="com.ibm.tws.dao.model.
=all:com.ibm.tws.dao.rdbms.=all"/>
```

3. Copy the updated template file to `TWA_DATA_DIR /usr/servers/engineServer/configDropins/overrides`. Changes are effective immediately.

Traces are stored in `DWC_DATA_dir/appserver/engineServer/logs`.

The **trace.specification** can be found in `trace.xml` files and can refer to a specific component (`tws_XXX`) or to the whole product, as follows:

**tws\_all**

```
"com.ibm.tws.=all:org.apache.wink.server.=all:com.hcl.tws.*=all"
```

**tws\_alldefault**

```
"com.ibm.tws.*=error=enabled"
```

**tws\_broker\_all**

```
"com.ibm.scheduling.*=all:TWSAgent=all"
```

**tws\_rest**

"com.ibm.tws.conn.=all:com.ibm.tws.twsd.rest.=all:org.apache.wink.server.\*=all"

**tws\_cli**

"com.ibm.tws.cli.=all:com.ibm.tws.objects.=all"

**tws\_utils**

"com.ibm.tws.util.\*=all"

**tws\_conn**

"com.ibm.tws.conn.=all:com.ibm.tws.objects.=all:com.ibm.tws.updatemanager.=all:com.ibm.tws.dao.plan.=all"

**tws\_db**

"com.ibm.tws.dao.model.=all:com.ibm.tws.dao.rdbms.=all"

**tws\_planner**

"com.ibm.tws.planner.=all:com.tivoli.icalendar.=all:com.ibm.tws.runcycles.=all:com.ibm.tws.conn.planner.=all:com.ibm.tws.cli.plan"

**tws\_secjni**

"com.ibm.tws.audit.=all:com.ibm.tws.security.=all"

**tws\_engine\_broker\_all**

"com.ibm.tws.=all:com.ibm.scheduling.=all:TWSAgent=all"

Editing the logging element above with the **traceSpecification** value to `tws_all`, enables

**"com.ibm.tws.=all:org.apache.wink.server.=all:com.hcl.tws.\*=all"**.

Other values are reported in variable tags above. You can also replace the value of the **trace.specification** parameter with a custom string.

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- libmsg
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- ISMP Installer

- HSQLDB
- Quick
- Infozip

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